B

Type

X

Plans

GRDIA - 0100

Permit Number

2110

Street Number

Hwy 116 N

Street Name

GRA

Community Code

130 - 263 - 004

APN

PRMD County of Sonoma

COUNTY OF SONOMA - PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403 (707) 565-1900 FAX (707) 565-1103

Please Print Your Name: | Date Applied:

JOB ADDRESS: 2110 HWY 116 N. GRA

PERMIT NUMBER: GRD14-0100

INSPECTION AREA:

INFORMATION WITHIN HEAVY LINE TO BE COMPLETED BY APPLICANT

SITE LOCATION INFORMATION - PRINT CLEARLY

Site Address: 2110 GRAVENSTEIN HWY N City: SEBASTOPOL ZIP: 95472

Cross-Street: OCCIDENTAL ROAD APN: 130-263-004 Project Phone #: 707 542-6559 Project Fax #: ( )

Directions: CORNER OF OCCIDENTAL & HWY 116 Email: ROB@HUFFMANENGINEERING.NET Unit

Describe Project: GRADING AND DRAINAGE FOR A NEW BUILDING AND PARKING LOT

Living Area ______ Garage ______ Decks ______ Contract Price:

OWNER NAME AND ADDRESS	APPLICANT NAME AND ADDRESS
Name: GEORGE HUSARY	Name: ROB HUFFMAN
Mailing Address: 2110 GRAVENSTEIN HWY	Mailing Address:
City: SEBASTOPOL State: CA ZIP: 95472	City: State: ZIP:
Day Ph: ( ) Fax: ( )	Day Ph: ( ) Fax: ( )

CONTRACTOR INFORMATION	OTHER PERSONS (ARCHITECT, ENGINEER, ETC.)
Company Name:	Name: ROB HUFFMAN P.E.
Address:	Address: 537 COLLEGE AVE
City: State: ZIP:	City: SANTA ROSA State: CA ZIP: 95404
Day Ph: ( ) Fax: ( )	Day Ph: 707 542-6559 Fax: ( )
	License No: 42293 Exp. Date: 3/31/16

WORKER'S COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

☐ I have and will maintain a certificate of consent to self-insure for worker's compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued.

☐ I have and will maintain worker's compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My worker's compensation insurance carrier and policy number are:

Carrier ______
Policy No. ______

(This section need not be completed if the permit is for one hundred dollars ($100) or less).

☐ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the worker's compensation laws of California, and agree that if I should become subject to the worker's compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Exp. Date: ______ Applicant: ______

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS ($100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

CONSTRUCTION LENDING DECLARATION

I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued. (Sec. 3097, Civ. C.).

Lenders Name ______
Lenders Address ______

FOR DEPARTMENT USE

Zoning C1, SR File No. ADR13-0073 Acres 1.45
Existing Use/Structures gas station
Proposed Use/Structures Grading for new bldg + parking
Zoning Min. Yard Requirements: Front 0 Left 0 Right 0 Back 0
NOTE: Fire Safe Standards require all parcels greater than 1 Acre to have a min. 30' setback unless mitigated. ☐ Mitigation Required ☐ Address subject to change
Approval for Permit Issuance: Approval for Occupancy:
By: Reg Cellen for Karyn Therau
Date: Date:
Conditions: See ADR13-0073.

Sewer Connection: ☐ Available ☐ Fees Paid
Approved by: ______ Date: ______

Road Encroachment: ☐ Fees Paid
Approved by: ______ Date: ______

Septic System Permit/Clearance #
Approved by: [signature] Date: 6/25/14

Flood Zone: ☐ Yes ☐ No 100 Year Flood Elevation:
Site Review
Drainage Review: Reg Cellen for Alex Rosas
Approved by: Date: 30 Sep 14

Fire: Reg Cellen for SM Fire
Approved by: Date: 30 Sep 14

Code Enforcement Violation ☐ Yes ☐ No Violation #
This permit is limited to ______ days.

OWNER-BUILDER DECLARATION

I hereby affirm under penalty of perjury that I am exempt from the Contractor's License Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractor's License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars ($500).):

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044 Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.).

☐ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.).

☐ I am exempt under Sec. ______, B & P.C. for this reason ______

By my signature below I acknowledge that, except for my personal residence in which I must have resided for at least one year prior to completion of the improvements covered by this permit, I cannot legally sell a structure that I have built as an owner-builder if it has not been constructed in its entirety by licensed contractors. I understand that a copy of the applicable law, Section 7044 of the Business and Professions Code, is available upon request when this application is submitted or at the following website: http://www.leginfo.ca.gov/calaw.html.

6/25/14 [signature]
Date Signature of Property Owner or Authorized Agent

LICENSED CONTRACTOR'S DECLARATION

I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

Lic. Class ______ Lic. No. ______
Exp. Date ______ Contractor ______

Work Authorized: Grading and drainage for 2 New retail buildings, parking lot and accessibility.

ASBESTOS DECLARATION

Written asbestos notification pursuant to Part 61 of Title 40 of the Code of Federal Regulations is required when asbestos exists in buildings, or portions thereof, undergoing demolition. I hereby declare that demolition authorized by this permit is from construction that (☐ does) (☐ does not) contain asbestos, or that ☐ no demolition is authorized by this permit.

☑ Plans Approved	☐ Post FIRM	☐ Alquist Priolo Report Available		
☐ No Plans Subject to Field Inspection	☐ Pre FIRM	☐ Geotechnical report Available		
Plancheck Cleared By: Reg Cellen for A Rosas 42	Date: 30 Sep 14	Type of Construction	Occupancy	No. of Stories	No. of Bedrooms
Permit Cleared for Issuance By: [signature]	Date:	Auto. Fire Sprinklers Req'd	No of Units	Certificate of Occupancy

Revised: 01/29/2009

I certify that I have read this application and affirm under penalty of perjury that the above information is correct. I agree to comply with all local Ordinances and State laws relating to building construction. I hereby authorize representatives of the County of Sonoma to enter upon the above-mentioned property for inspection purposes. If, after making the Certificate of Exemption for the Worker's Compensation provision of the Labor Code I should become subject to such provisions, I will forthwith comply. In the event I do not comply with the Workman's Compensation law, this permit shall be deemed revoked.

[signature]
PERMITTEE SIGNATURE
537 College / Santa Rosa 95404
ADDRESS CITY ZIP

☐ Contractor ☐ Owner ☐ Other Licensed Professional

Receipt for Permit Fee $

PAYMENT REC'D OCT 03 2014 PERMIT AND RESOURCE MANAGEMENT DEPARTMENT COUNTY OF SONOMA

THIS PERMIT SHALL EXPIRE IN THREE(3) YEARS FROM DATE FEES ARE PAID UNLESS OTHERWISE NOTED BY CODE ENFORCEMENT

Distribution: White - File Canary - Applicant Blue - Assessor Cardstock - Inspector

COUNTY OF SONOMA - PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403 (707) 565-1900 FAX (707) 565-1103

Please Print Your Name: MARC MATULICH **Date Applied:** 6/30/06

INFORMATION WITHIN HEAVY LINE TO BE COMPLETED BY APPLICANT

JOB ADDRESS: 2110 Hwy 116 N GEA PERMIT NUMBER: BRD06-0190 INSPECTION AREA: 4

SITE LOCATION INFORMATION - PRINT CLEARLY

Site Address: 2110 GRAVENSTEIN HWY N City: SEBASTOPOL ZIP: 95472

Cross-Street: OCCIDENTAL RD APN: 130-263-004 Project Phone #: ( ) 829 8252 Project Fax #: ( ) 829-8440

Directions:

Subd. Name: Unit #: Lot #:

Describe Project: RETAIL/OFFICE CNTR GRADING

Living Area: 7,200 SF Garage: Decks: Contract Price:

OWNER NAME AND ADDRESS

Name: GEOGE HUSARY

Mailing Address: SAME AS ABOVE

City: State: ZIP:

Day Ph: ( ) Fax: ( )

APPLICANT NAME AND ADDRESS

Name: SAME AS OWNER

Mailing Address:

City: State: ZIP:

Day Ph: ( ) Fax: ( )

CONTRACTOR INFORMATION

Company Name:

Address:

City: State: ZIP:

Day Ph: ( ) Fax: ( )

OTHER PERSONS (ARCHITECT, ENGINEER, ETC.)

Name: MARC MATULICH - ARCH

Address: 67 BROOKWOOD AV. #B

City: SANTA ROSA State: CA ZIP: 95404

Day Ph: ( ) 523 4681 Fax: ( ) 523-1437

License No: C12701 Exp. Date: 8/30/07

WORKER'S COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

☐ I have and will maintain a certificate of consent to self-insure for worker's compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued.

☐ I have and will maintain worker's compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My worker's compensation insurance carrier and policy number are:

Carrier

Policy No.

(This section need not be completed if the permit is for one hundred dollars ($100) or less).

☐ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the worker's compensation laws of California, and agree that if I should become subject to the worker's compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Exp. Date: Applicant:

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS ($100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

CONSTRUCTION LENDING DECLARATION

I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued. (Sec. 3097, Civ. C.).

Lenders Name

Lenders Address

OWNER-BUILDER DECLARATION

I hereby affirm under penalty of perjury that I am exempt from the Contractor's License Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractor's License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars ($500).):

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044 Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.).

X ☐ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.).

☐ I am exempt under Sec. _____, B & P.C. for this reason

Date 6/30/06 Owner George Husary

LICENSED CONTRACTOR'S DECLARATION

I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

Lic. Class Lic. No.

Exp. Date Contractor

ASBESTOS DECLARATION

Written asbestos notification pursuant to Part 61 of Title 40 of the Code of Federal Regulations is required when asbestos exists in buildings, or portions thereof, undergoing demolition. I hereby declare that demolition authorized by this permit is from construction that (☐ does) (☐ does not) contain asbestos, or that ☐ no demolition is authorized by this permit.

I certify that I have read this application and affirm under penalty of perjury that the above information is correct. I agree to comply with all local Ordinances and State laws relating to building construction. I hereby authorize representatives of the County of Sonoma to enter upon the above-mentioned property for inspection purposes. If, after making the Certificate of Exemption for the Worker's Compensation provision of the Labor Code I should become subject to such provisions, I will forthwith comply. In the event I do not comply with the Workman's Compensation law, this permit shall be deemed revoked.

George Husary Jr. 95472

PERMITTEE SIGNATURE

2110 GRAVENSTEIN HWY SEB 95404

ADDRESS CITY ZIP

☐ Contractor X Owner ☐ Other Licensed Professional

FOR DEPARTMENT USE

Zoning C1 SR File No. Acres 1.46

Existing Use/Structures Gas Station & SFD (to demo.)

Proposed Use/Structures New Office/Retail

Zoning Min. Yard Requirements: Front ____ Left ____ Right ____ Back ____

NOTE: Fire Safe Standards require all parcels greater than 1 Acre to have a min. 30' setback unless mitigated. ☐ Mitigation Required ☐ Address subject to change

Approval for Permit Issuance: By: KT BOR Date:

Approval for Occupancy: By: Date:

Conditions: DRH05-0002 - See Karin T.

Sewer Connection: ☐ Available ☐ Fees Paid

Approved by: Date:

Road Encroachment: ☐ Fees Paid STATE HWY

Approved by: Date: 6/30/06

Septic System Permit/Clearance:

Approved by: Date: 8/28/07

Flood Zone: ☐ Yes ☐ No 100 Year Flood Elevation:

Site Review

Drainage Review:

Approved by: Date:

Fire:

Approved by: J FADDIS (66) Date: 7/5/06

Code Enforcement Violation ☐ Yes X No Violation # File closed

This permit is limited to _____ days.

Work Authorized: Grading for office center & parking lot

X Plans Approved ☐ No Plans Subject to Field Inspection

☐ Post FIRM ☐ Alquist Priolo Report Available ☐ Pre FIRM ☐ Geotechnical report Available

Plancheck Cleared By	Date:	Type of Construction	Occupancy	No. of Stories	No. of Bedrooms
Earl Smith	4-27-07	VN	M/B	1	0

Permit Cashier Issuance By	Date	Auto. Fire Sprinklers Req'd	No of Units	Certificate of Occupancy
[illegible]	8/28/07	yes		

Amount Paid on Permit: $

RECEIVED

AUG 28 2007

PERMIT AND RESOURCE MANAGEMENT DEPARTMENT COUNTY OF SONOMA

Final Date:	Inspector:

THIS PERMIT SHALL EXPIRE IN THREE(3) YEARS FROM DATE FEES ARE PAID UNLESS OTHERWISE NOTED BY CODE ENFORCEMENT

senmis f:\forms\cis\CIS-007.cdr Revised: 4/8/2004

Distribution: White - File Canary - Applicant Pink - Audit Copy Blue - Assessor Cardstock - Inspector

HUFFMAN ENGINEERING & SURVEYING

537 College Avenue, Suite A, Santa Rosa, CA 95404

707-542-6559 www.huffmanengineering.net

February 8, 2016

Eric Doble
County of Sonoma PRMD
2550 Ventura Ave.
Santa Rosa, CA 95403

RE: Grading inspection 2110 Gravenstein Hwy North, APN: 130-263-004, GRD14-~~100~~ 0100

Dear Eric,

A site inspection was conducted to observe the work done relating to the grading and drainage improvements at the above-mentioned project. In general, the work was in substantial compliance with the plans prepared by our office.

Below are the modifications made in the field:

SHEET 1

- Corrected structure table for installed drop inlets including additional inlets added.

SHEET 4

- Accessible walkway toward Hwy116 was realigned to meet ADA standards for slopes and cross slopes. Walkway was also installed in concrete rather than AC
- 3"x12" Box culvert was stopped at edge of concrete rather than carried through to basin, rock in basin was brought to edge of sidewalk rather than allowing space for landscape.
- ADA walkway at rear of store and adjacent to ADA parking was revised to eliminate ramping.
- The fire hydrant shown adjacent the trash enclosure was relocated to the location of an existing warf hydrant planned to be removed.
- Fire water valves and appurtenances near the fire pump house were adjusted.
- Storm drainage along the south side of the new building was adjusted and realigned.
- The steps along the south side of the new building were shifted away from the building and a retaining wall constructed to create a new landscape area adjacent the building.

SHEET 5

- The fire hydrant shown adjacent the trash enclosure was relocated to the location of an existing warf hydrant planned to be removed. The alignment of the FW line was revised accordingly.
- Fire water valves and appurtenances near the fire pump house were adjusted.

- Storm drainage along the south side of the new building was adjusted and realigned.
- The steps along the south side of the new building were shifted away from the building and a retaining wall constructed to create a new landscape area adjacent the building.

SHEET 6

- Location of DIs were adjusted.
- Gas meter bank was moved to the front side of the building, from the rear.
- DI#2 & #3 planned to be Kristar boxes were installed as 6" plastic landscape drains.
- Additional landscape drains were added(DI#9 & 10)
- DI#6 was eliminated and landscape area it supported was poured in concrete.
- 2" Drain pipes were added relieve windblown rain captured in gravel areas adjacent to building.
- ADA ramping and trench drains were revised on the southern end of the building. Sections A-A, B-B, & C-C are no longer accurate.
- Storm drainage along the south side of the new building was adjusted and realigned.
- The steps along the south side of the new building were shifted away from the building and a retaining wall constructed to create a new landscape area adjacent the building.

SHEET 7

- Portions of Section A-A, B-B, & C-C. are no longer accurate.

Erosion control measures were installed as shown on the approved plans.

If you have any questions please call us at 542-6559.

Sincerely,

Rob Huffman, PE
Professional Engineer
RH:sma
14-036

GRD14-0100

Huffman Engineering & Surveying
537 College Ave.
Santa Rosa, California 95404
(707) 542-6559

Hydrology Study

For

Owner
Mousa Husary
2110 Gravenstein Hwy N
Sebastopol, California

Site
2110 Gravenstein Hwy N
Sebastopol, California
APN: 130-263-004

October 9, 2015
Job# 14-036

HUFFMAN ENGINEERING & SURVEYING

537 College Avenue, Suite A, Santa Rosa, CA 95404

707-542-6559 www.huffmanengineering.net

September 24, 2015

Drainage Review
County of Sonoma PRMD
2550 Ventura Ave.
Santa Rosa, CA 95403

RE: 2110 Gravenstein Highway North, Sebastopol, CA

Dear Drainage Review,

The above mentioned project has been designed to complete grading started under GRD06-0190 for the construction of a new single story commercial/retail building and associated parking lot. The cuts for the new pad and portions of the parking lot were completed in 2006. Fire water storage tanks were also installed at the time. The owner has stated that the new septic system was installed and finaled after the grading work was completed. Many of the parking lot grades and much of the storm drainage system has been redesigned from the 2006 permit to conform to the current grading ordinance requirements to limit post-development storm water levels as discussed below. Storm drainage has been designed to route water around the new building and across the parking area to one of two infiltration basins. The infiltration basins are located south east of the new parking areas. The basins area designed with overflow structures to prevent storm water from overflowing and flooding the parking area or adjacent improvements. The infiltration basins are shown connected to an existing drainage system which will carry storm water to the public storm drain system along occidental road.

Calculations were performed to estimate the increase in storm water volumes created by the proposed development. According to NRCS Web Soil Survey, soils in the area are categorized as Hydrologic Soil Group C. Storm water infiltration basins have been designed such that the difference between the pre & post development 85th percentile 24-hour storm event will be captured in a rock basin and allowed to infiltrate as much as possible before the basin overflows. Most storm water flows are captured from or route across vegetated areas and to the infiltration basin. Additional for filtration and infiltration will occur within the basin. In our opinion storm water levels and quality will remain in kind with existing.

Based on our review of USGS 7.5 minute Quad Maps and aerial photography, drainage patterns are in-line with those shown on the enclosed hydrology mapping. We have sized all pipes & swales to meet the 10-year flow rates. Hydraulic calculations are enclosed.

If you have any questions, please call us at 542-6559.

Sincerely,

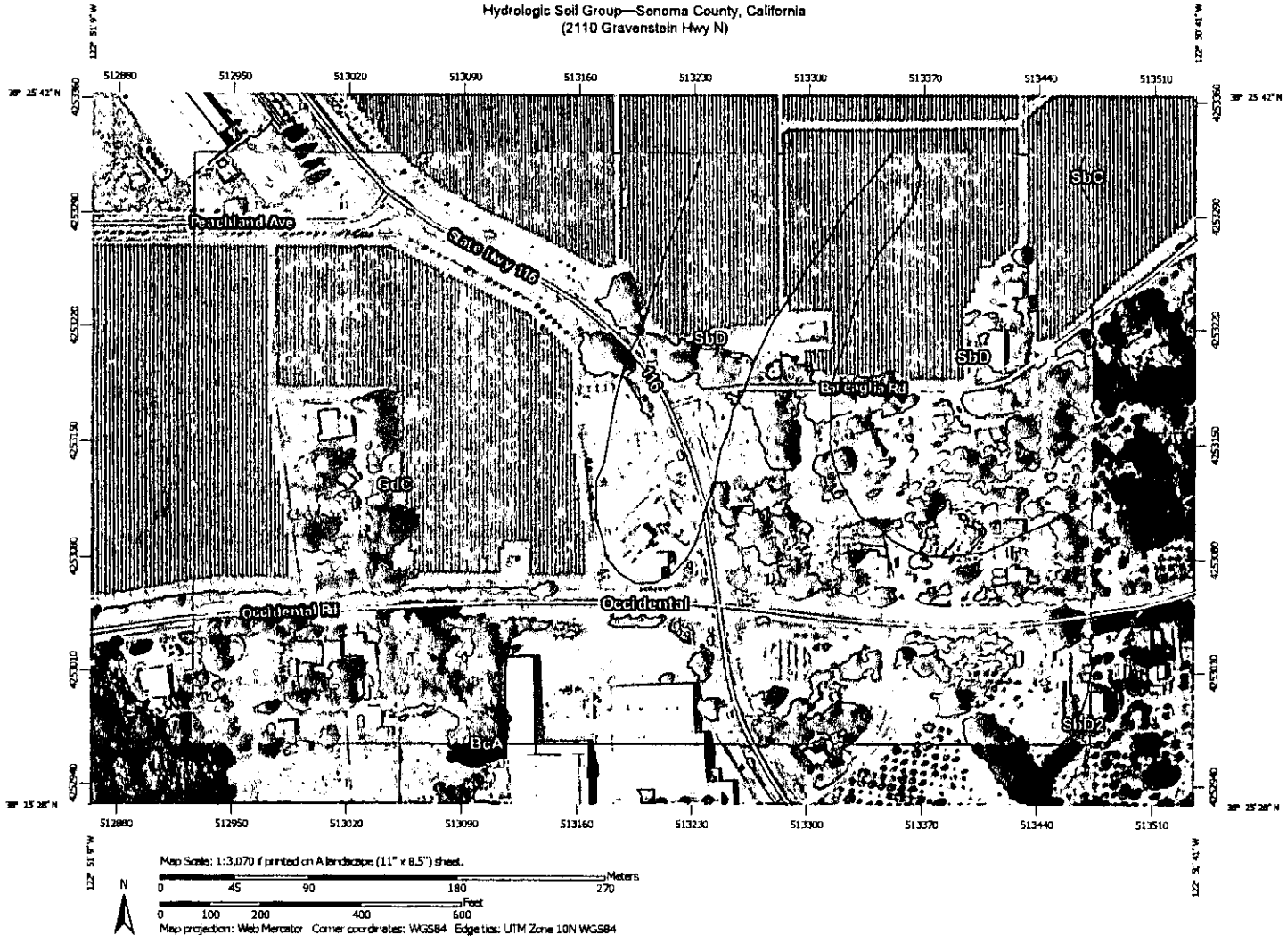
Rob Huffman, PE
Professional Engineer
RH:sa
14-036

INDEX

Calculations

Mapping

Hydrologic Soil Group—Sonoma County, California
(2110 Gravenstein Hwy N)



Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Sonoma County, California (CA097)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BcA	Blucher fine sandy loam, overwash, 0 to 2 percent slopes	C	0.0	0.0%
GdC	Goldridge fine sandy loam, 2 to 9 percent slopes	C	35.9	73.0%
SbC	Sebastopol sandy loam, 2 to 9 percent slopes	C	0.0	0.1%
SbD	Sebastopol sandy loam, 9 to 15 percent slopes	C	13.2	26.8%
SbD2	Sebastopol sandy loam, 9 to 15 percent slopes, eroded	C	0.1	0.1%
Totals for Area of Interest			**49.2**	**100.0%**

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area [2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2c Runoff curve numbers for other agricultural lands [1]

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing. [2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. [3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30 [4]	48	65	73
Woods—grass combination (orchard or tree farm). [5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. [6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30 [4]	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

1 Average runoff condition, and $I_a = 0.2S$.

2 *Poor:* <50%) ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

3 *Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

4 Actual curve number is less than 30; use CN = 30 for runoff computations.

5 CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

6 *Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

6 Runoff Reduction Areas

6.1 Design Philosophy

Using alternative surfaces with a lower coefficient of runoff or "C-Factor" helps reduce runoff from developed areas. The C-Factor is a representation of a surface's ability to produce runoff. Surfaces that produce higher volumes of runoff are represented by higher C-Factors, such as impervious surfaces. Surfaces that produce smaller volumes of runoff are represented by lower C-Factors, such as more pervious surfaces. See Table 6-1 for typical C-Factor values for various surfaces during small storms.

Table 6-2 compares the C-Factors of conventional paving surfaces to alternative, lower C-Factor paving surfaces. By incorporating more pervious, lower C-Factor surfaces into a development, lower volumes of runoff are produced. Lower volumes and rates of runoff translate directly to lower treatment requirements.

Site design techniques may be used to reduce the C-Factor of a developed area, reducing the amount of runoff requiring treatment, including:

- Pervious Concrete
- Pervious Asphalt
- Turf Block
- Brick (un-grouted)
- Natural Stone
- Concrete Unit Pavers
- Crushed Aggregate
- Cobbles
- Wood Mulch

Other site design techniques such as disconnecting impervious areas, preservation of natural areas, and designing concave medians may be used to reduce the overall C-Factor of development areas.

Table 6-1
Estimated C-Factors for Various Surfaces During Small Storms

Paving Surface	*C-Factor*
Concrete	0.80
Asphalt	0.70
Pervious Concrete	0.60
Cobbles	0.60
Pervious Asphalt	0.55
Natural Stone without Grout	0.25
Turf Block	0.15
Brick without Grout	0.13
Unit Pavers on Sand	0.10
Crushed Aggregate	0.10
Grass	0.10
Grass Over Porous Plastic	0.05
Gravel Over Porous Plastic	0.05

Note: C-Factors for frequent small storms used to size water quality BMPs are likely to differ (be lower) than C-Factors developed for infrequent, large storms used to size flood control facilities. The above C-Factors were produced by selecting the lower end of the best available C-Factor range for each paving surface. These C-Factors are only appropriate for small storm treatment design, and should not be used for flood control sizing. Where available, locally developed small storm C-Factors for various surfaces should be utilized.

PRE-DEVELOPMENT COMPOSIT RUNOFF COEFFICIENT CALCULATOR (HYDROLOGIC SOIL GROUP C)

POC 1	AREA(Sq.Ft.)	% OF TOTAL	C-2YR	CN
Wood/Grass	7303	27%	0.10	86
Gravel	0	0%	0.10	89
Asphalt	1140	4%	0.70	93
Roof	2687	10%	0.90	98
Concrete	15641	58%	0.80	98
TOTAL TRIBUTARY	26771	100%	**0.61**	**95**

POC 2	AREA(Sq.Ft.)	% OF TOTAL	C-2YR	CN
Wood/Grass	24709	53%	0.10	86
Gravel	2780	6%	0.10	89
Asphalt	17609	38%	0.70	93
Roof	1261	3%	0.90	98
Concrete	434	1%	0.80	98
TOTAL TRIBUTARY	46793	100%	**0.35**	**89**

LOC 1	AREA(Sq.Ft.)	% OF TOTAL	C-2YR	CN
Wood/Grass	10723	98%	0.10	76
Gravel	0	0%	0.10	89
Asphalt	0	0%	0.70	93
Roof	64	1%	0.90	98
Concrete	176	2%	0.80	98
TOTAL TRIBUTARY	10963	100%	**0.12**	**76**

POST-DEVELOPMENT COMPOSIT RUNOFF COEFFICIENT CALCULATOR (HYDROLOGIC SOIL GROUP C)

POC 1	AREA(Sq.Ft.)	% OF TOTAL	C-2YR	CN
Wood/Grass	676	4%	0.10	86
Gravel	0	0%	0.10	89
Asphalt	2378	15%	0.70	93
Roof	385	2%	0.90	98
Concrete	12813	79%	0.80	98
TOTAL TRIBUTARY	16252	100%	**0.76**	**97**

POC 2	AREA(Sq.Ft.)	% OF TOTAL	C-2YR	CN
Wood/Grass	19924	32%	0.10	86
Gravel	1308	2%	0.10	89
Asphalt	29371	48%	0.70	93
Roof	7948	13%	0.90	98
Concrete	2794	5%	0.80	98
TOTAL TRIBUTARY	61345	100%	**0.52**	**92**

LOC 1	AREA(Sq.Ft.)	% OF TOTAL	C-2YR	CN
Wood/Grass	5682	83%	0.10	76
Gravel	0	0%	0.10	89
Asphalt	0	0%	0.70	93
Roof	542	8%	0.90	98
Concrete	631	9%	0.80	98
TOTAL TRIBUTARY	6855	100%	**0.23**	**80**

Volume Capture Calculations						
Seasonal Rainfall= 37				K= 1.23		
Pre-Development:	POC#1	POC#2	LOA#1			
Area(Sq.Ft)	26771	46793	10963	0	0	See Sheet H2
Composit-CN(Curve Number)	95	89	76	1	1	Woods/Grass(Soil Group C - Good Condition)
S(Potential Max Retention)	0.53	1.24	3.16	990.00	990.00	S=(1000/CN)-10
Q(Runoff Depth in Feet)	0.06	0.03	0.01	4.07	4.07	Q=[((PxK)-(0.2xS)^2)]/[(PxK)+(0.8xS)] x (1/12)
Volume of Runoff(Cu.Ft.)	1519.58	1446.35	63.16	0.00	0.00	Q*Area
Post Development:	POC#1	POC#2	LOA#1			
Area(Sq.Ft)	16252	61345	6855	0	0	See Sheet H3
Composit-CN(Curve Number)	97	92	80	1	1	See Post-Dev. Runoff Coefficient Calculations
S(Potential Max Retention)	0.31	0.87	2.50	990.00	990.00	S=(1000/CN)-10
Q(Runoff Depth in Feet)	0.0694	0.0420	0.0107	4.0720	4.0720	Q=[((PxK)-(0.2xS)^2)]/[(PxK)+(0.8xS)] x (1/12)
Volume of Runoff(Cu.Ft.)	1127.81	2578.07	73.41	0.00	0.00	Q*Area
Results:	POC#1	POC#2	LOA#1			
Volume Capture (Goal)	1127.81	2578.07	73.41	0.00	0.00	100%-Post-development Runoff
Volume Capture (Requirement)	-391.77	1131.72	10.25	0.00	0.00	Difference Between Pre & Post Volume
Porosity of Rock Fill	0.40	0.40	0.40	0.40	0.40	See Infiltration Trench Detail
Volume of Basin (Goal)	2819.52	6445.18	183.51	0.00	0.00	Volume Capture Goal/Porosity
Volume of Basin (Requirment)	-979.42	2829.30	25.61	0.00	0.00	Volume Capture Requirement/Porosity
Sq.Ft. of 7' Deep Basin(Goal)	403	921	26	0	0	See Infiltration Trench Detail
Sq.Ft. of 7' Deep Basin(Required)	-140	404	4	0	0	See Infiltration Trench Detail
Values:						
P=Precipitation for the 85th percentile 24-Hour storm event=0.92in						
K=Seasonal Rainfall/30						

POST-DEVELOPMENT COMPOSIT RUNOFF COEFFICIENT CALCULATOR (10-YEAR)

AREA A	AREA(Sq.Ft.)	% OF TOTAL	C-10YR
Wood/Grass	654	15%	0.55
Gravel	0	0%	0.70
Asphalt	0	0%	0.90
Roof	3740	85%	0.90
Concrete	0	0%	0.90
TOTAL TRIBUTARY	4394	100%	**0.85**

AREA B	AREA(Sq.Ft.)	% OF TOTAL	C-10YR
Wood/Grass	198	100%	0.55
Gravel	0	0%	0.70
Asphalt	0	0%	0.90
Roof	0	0%	0.90
Concrete	0	0%	0.90
TOTAL TRIBUTARY	198	100%	**0.55**

AREA C	AREA(Sq.Ft.)	% OF TOTAL	C-10YR
Wood/Grass	0	0%	0.55
Gravel	0	0%	0.70
Asphalt	0	0%	0.90
Roof	1600	75%	0.90
Concrete	524	25%	0.90
TOTAL TRIBUTARY	2124	100%	**0.90**

AREA D	AREA(Sq.Ft.)	% OF TOTAL	C-10YR
Wood/Grass	0	0%	0.55
Gravel	0	0%	0.70
Asphalt	0	0%	0.90
Roof	1059	100%	0.90
Concrete	0	0%	0.90
TOTAL TRIBUTARY	1059	100%	**0.90**

AREA E	AREA(Sq.Ft.)	% OF TOTAL	C-10YR
Wood/Grass	907	47%	0.55
Gravel	0	0%	0.70
Asphalt	0	0%	0.90
Roof	0	0%	0.90
Concrete	1037	53%	0.90
TOTAL TRIBUTARY	1944	100%	**0.74**

AREA F	AREA(Sq.Ft.)	% OF TOTAL	C-10YR
Wood/Grass	14817	55%	0.55
Gravel	1103	4%	0.70
Asphalt	11096	41%	0.90
Roof	100	0%	0.90
Concrete	0	0%	0.90
TOTAL TRIBUTARY	27116	100%	**0.70**

AREA G	AREA(Sq.Ft.)	% OF TOTAL	C-10YR
Wood/Grass	2219	14%	0.55
Gravel	0	0%	0.70
Asphalt	11167	73%	0.90
Roof	1063	7%	0.90
Concrete	953	6%	0.90
TOTAL TRIBUTARY	15402	100%	**0.85**

AREA H	AREA(Sq.Ft.)	% OF TOTAL	C-10YR
Wood/Grass	347	11%	0.55
Gravel	0	0%	0.70
Asphalt	2199	70%	0.90
Roof	388	12%	0.90
Concrete	202	6%	0.90
TOTAL TRIBUTARY	3136	100%	**0.86**

AREA I	AREA(Sq.Ft.)	% OF TOTAL	C-10YR
Wood/Grass	0	0%	0.55
Gravel	0	0%	0.70
Asphalt	346	69%	0.90
Roof	0	0%	0.90
Concrete	159	31%	0.90
TOTAL TRIBUTARY	505	100%	**0.90**

FLOOD ROUTING HYDROLOGY CALCULATIONS

Huffman Engineering & Surveying 537 College Ave, Suite A Santa Rosa, California 95404 P: 707-542-6559 F: 707-542-6621						JOB NUMBER	14-036		
						CALCULATED BY	SMA		
						CALCULATED ON	October 9, 2015		
						SEASONAL RAINFALL	37		
AREA	TIME	K	I10	I25	I100	ACREAGE	C	Q10(cfs)	Q25(cfs)	Q100(cfs)
A	7	1.23	2.57	2.94	3.60	0.10	0.85	0.27	0.31	0.38
B	7	1.23	2.57	2.94	3.60	0.01	0.55	0.02	0.02	0.02
C	7	1.23	2.57	2.94	3.60	0.05	0.90	0.14	0.16	0.20
D	7	1.23	2.57	2.94	3.60	0.02	0.90	0.06	0.07	0.08
E	7	1.23	2.57	2.94	3.60	0.04	0.74	0.09	0.11	0.13
F	7	1.23	2.57	2.94	3.60	0.62	0.70	1.38	1.57	1.93
G	7	1.23	2.57	2.94	3.60	0.35	0.85	0.94	1.08	1.32
H	7	1.23	2.57	2.94	3.60	0.07	0.86	0.19	0.22	0.27
I	7	1.23	2.57	2.94	3.60	0.01	0.90	0.03	0.03	0.04

Channel Report

PIPE#1 - AREA C

Circular

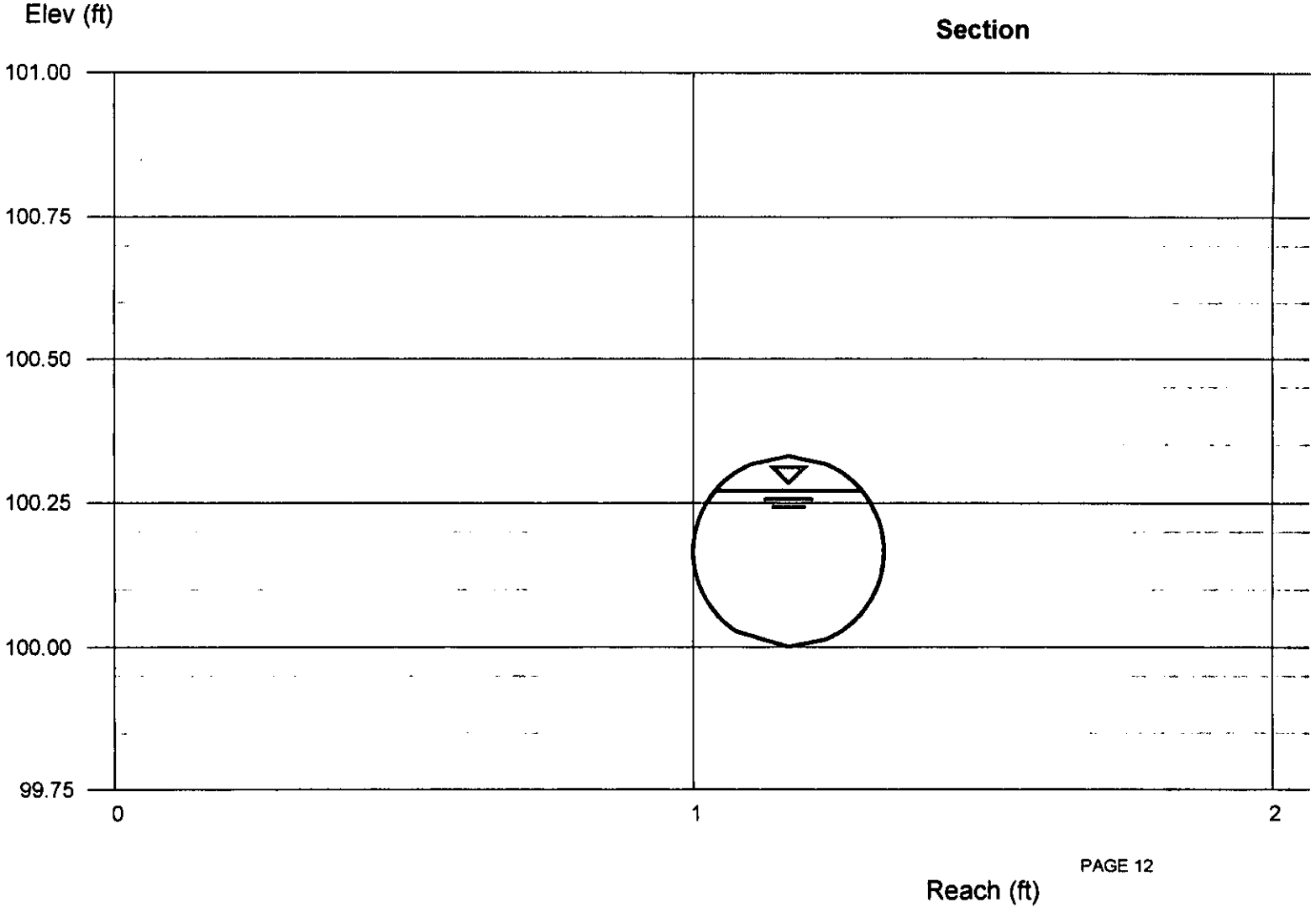
Diameter (ft)	= 0.33
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.14

Highlighted

Depth (ft)	= 0.27
Q (cfs)	= 0.140
Area (sqft)	= 0.08
Velocity (ft/s)	= 1.87
Wetted Perim (ft)	= 0.75
Crit Depth, Yc (ft)	= 0.22
Top Width (ft)	= 0.25
EGL (ft)	= 0.32



Channel Report

PIPE#2 - AREA C,D

Circular

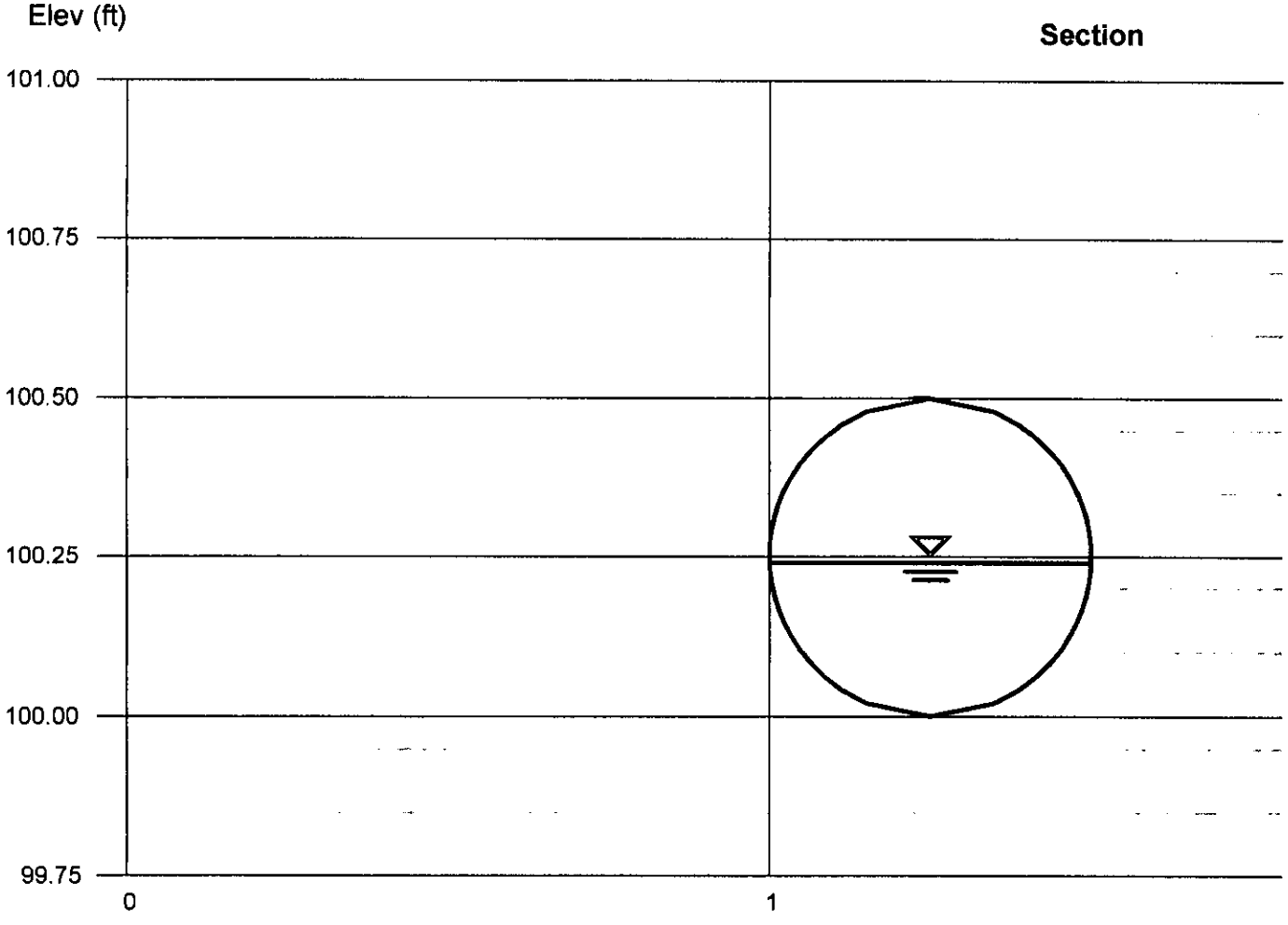
Diameter (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.20

Highlighted

Depth (ft)	= 0.24
Q (cfs)	= 0.200
Area (sqft)	= 0.09
Velocity (ft/s)	= 2.13
Wetted Perim (ft)	= 0.77
Crit Depth, Yc (ft)	= 0.23
Top Width (ft)	= 0.50
EGL (ft)	= 0.31



Reach (ft)

Channel Report

Pipe #3 - Areas: B,C,E,G

Circular

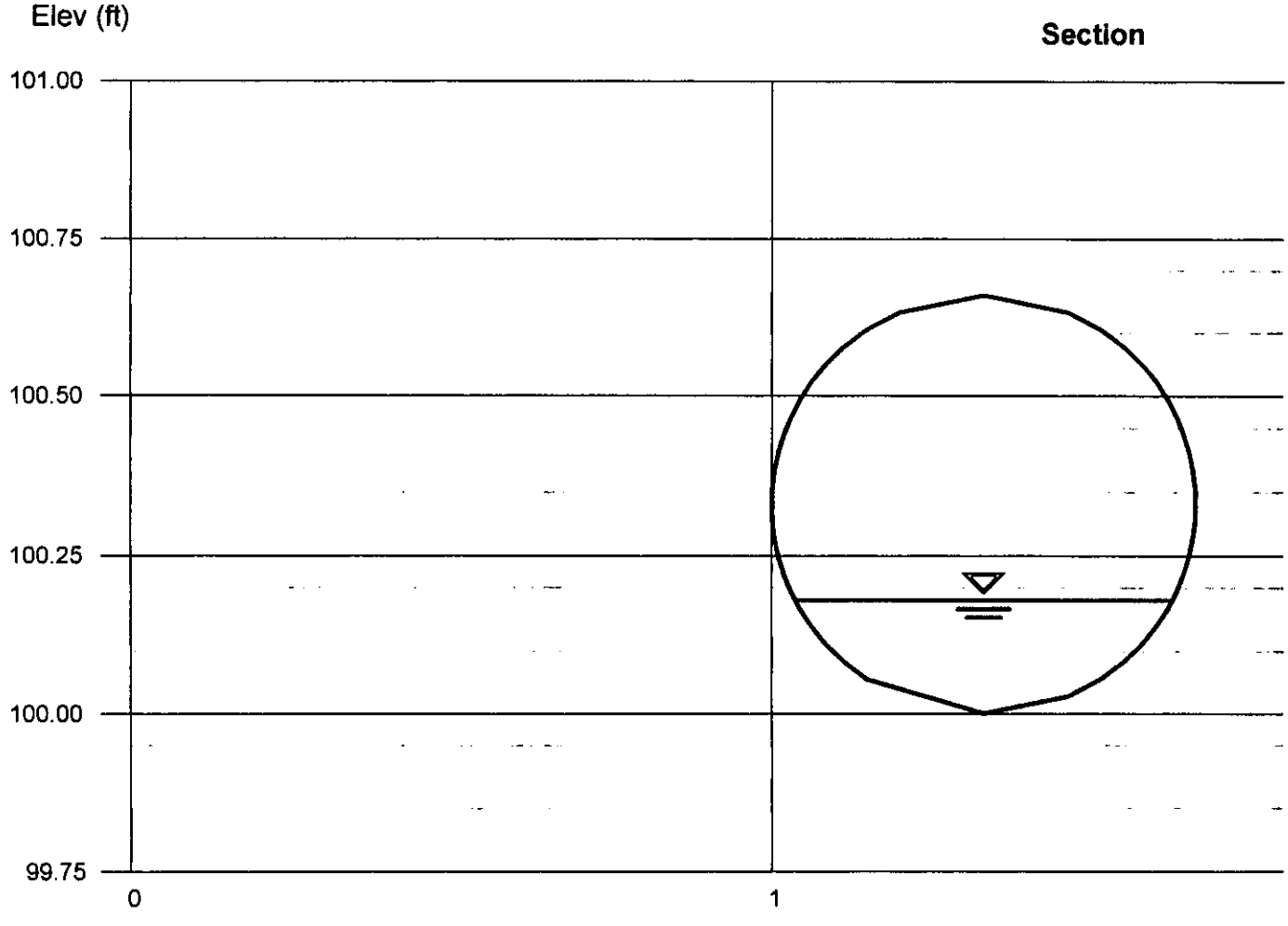
Diameter (ft)	= 0.66
Invert Elev (ft)	= 100.00
Slope (%)	= 3.34
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.34

Highlighted

Depth (ft)	= 0.18
Q (cfs)	= 0.340
Area (sqft)	= 0.08
Velocity (ft/s)	= 4.49
Wetted Perim (ft)	= 0.73
Crit Depth, Yc (ft)	= 0.28
Top Width (ft)	= 0.59
EGL (ft)	= 0.49



Channel Report

PIPE#4 - AREA C

Circular

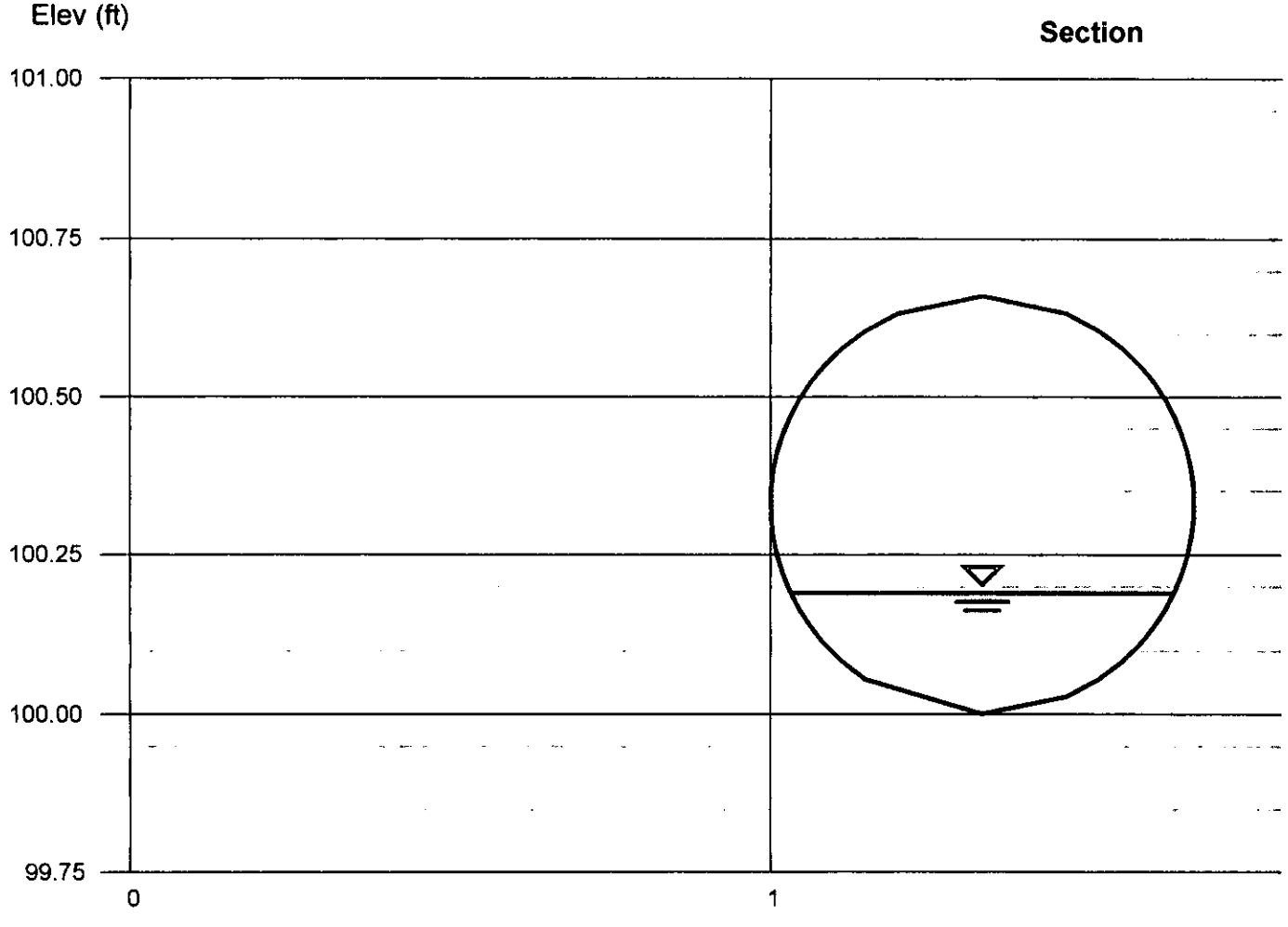
Diameter (ft)	= 0.66
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.16

Highlighted

Depth (ft)	= 0.19
Q (cfs)	= 0.160
Area (sqft)	= 0.08
Velocity (ft/s)	= 1.95
Wetted Perim (ft)	= 0.75
Crit Depth, Yc (ft)	= 0.19
Top Width (ft)	= 0.60
EGL (ft)	= 0.25



Reach (ft)

Channel Report

PIPE#5 - AREA A,B,C,D,E

Circular

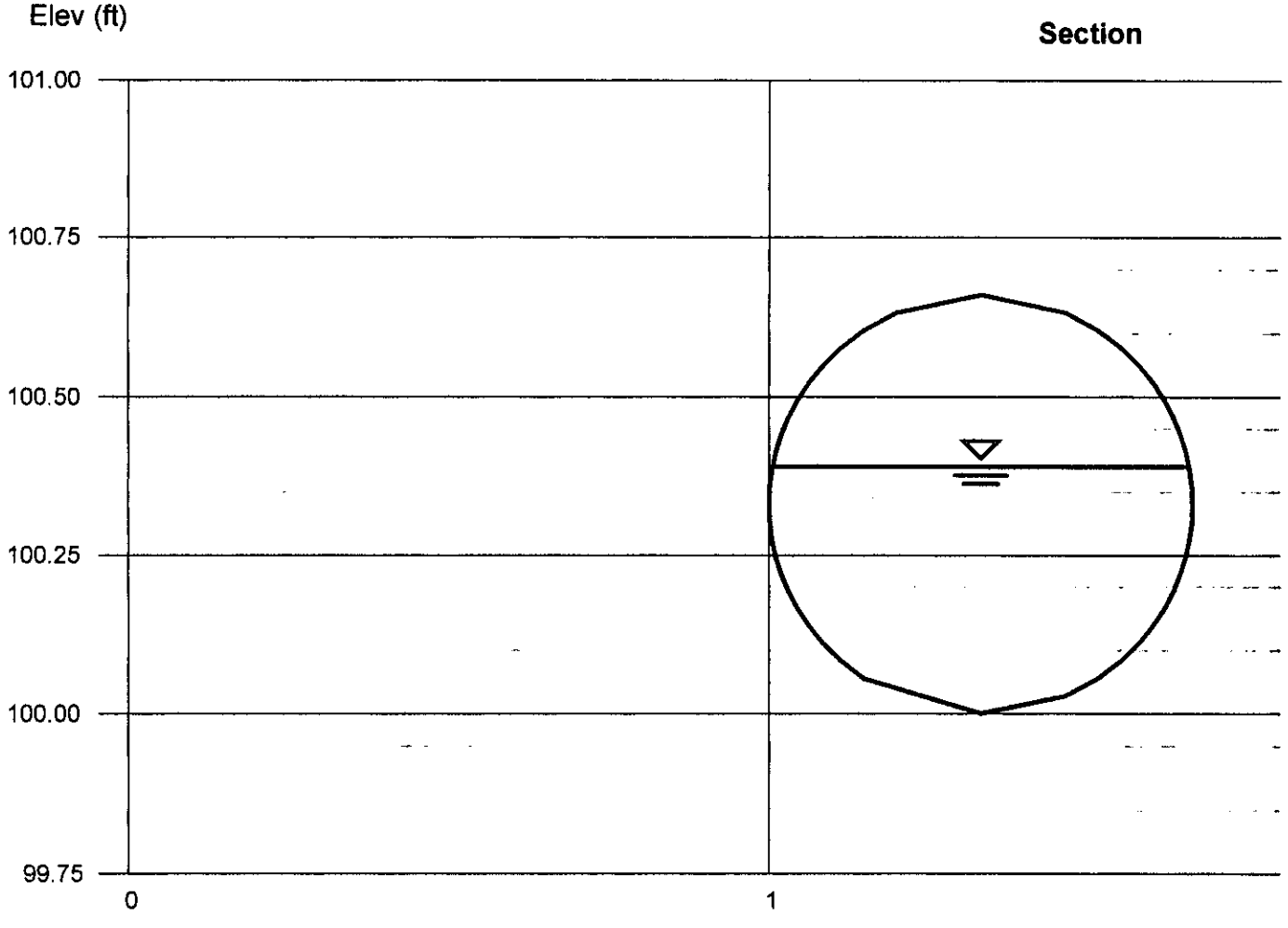
Diameter (ft)	= 0.66
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.58

Highlighted

Depth (ft)	= 0.39
Q (cfs)	= 0.580
Area (sqft)	= 0.21
Velocity (ft/s)	= 2.75
Wetted Perim (ft)	= 1.16
Crit Depth, Yc (ft)	= 0.36
Top Width (ft)	= 0.65
EGL (ft)	= 0.51



Reach (ft)

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. Friday, Oct 9 2015

PIPE#6 - AREA H

Rectangular

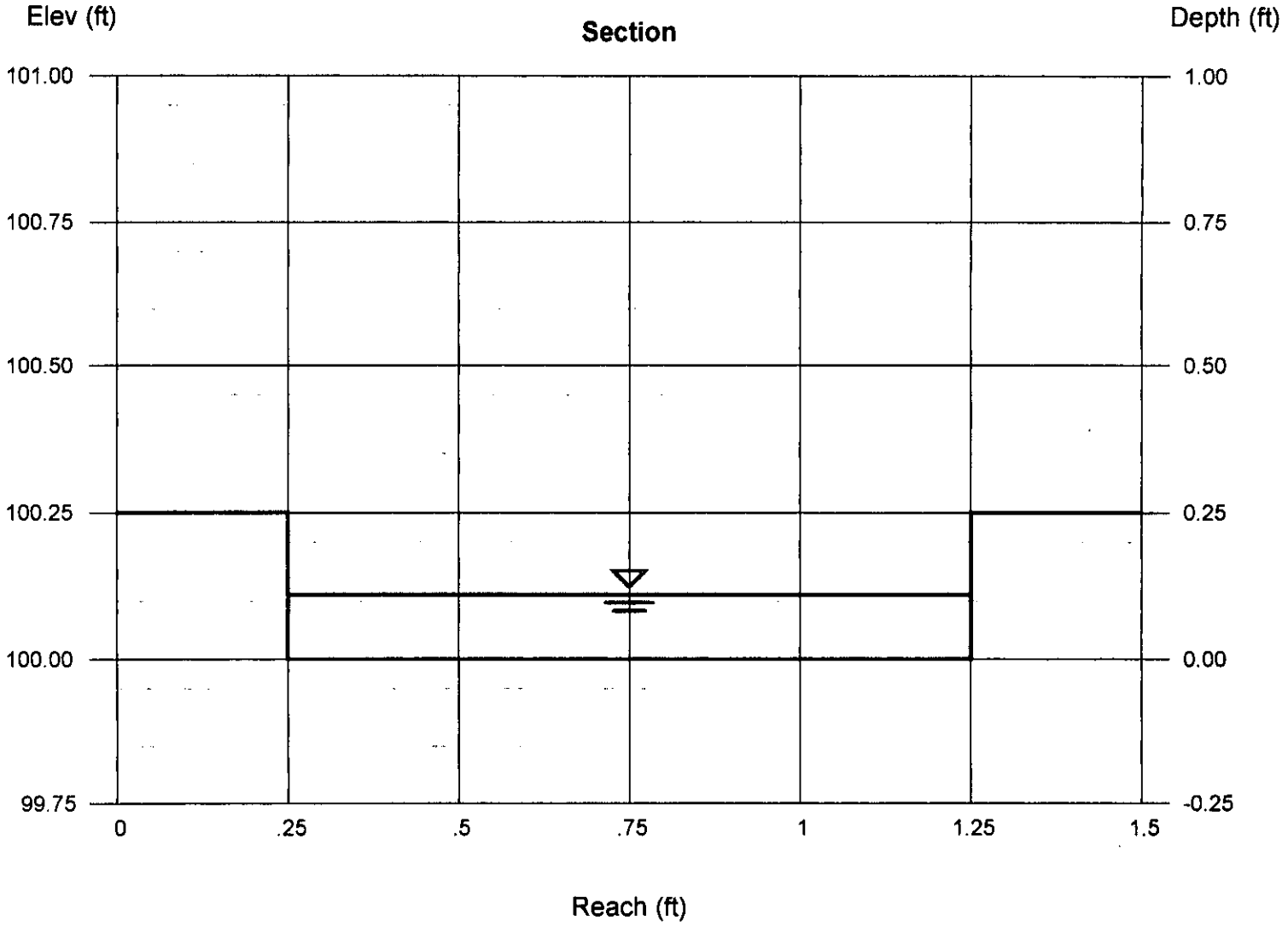
Bottom Width (ft)	= 1.00
Total Depth (ft)	= 0.25
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.19

Highlighted

Depth (ft)	= 0.11
Q (cfs)	= 0.190
Area (sqft)	= 0.11
Velocity (ft/s)	= 1.73
Wetted Perim (ft)	= 1.22
Crit Depth, Yc (ft)	= 0.11
Top Width (ft)	= 1.00
EGL (ft)	= 0.16



Channel Report

PIPE#7 - AREA A,B,C,D,E,F,G

Circular

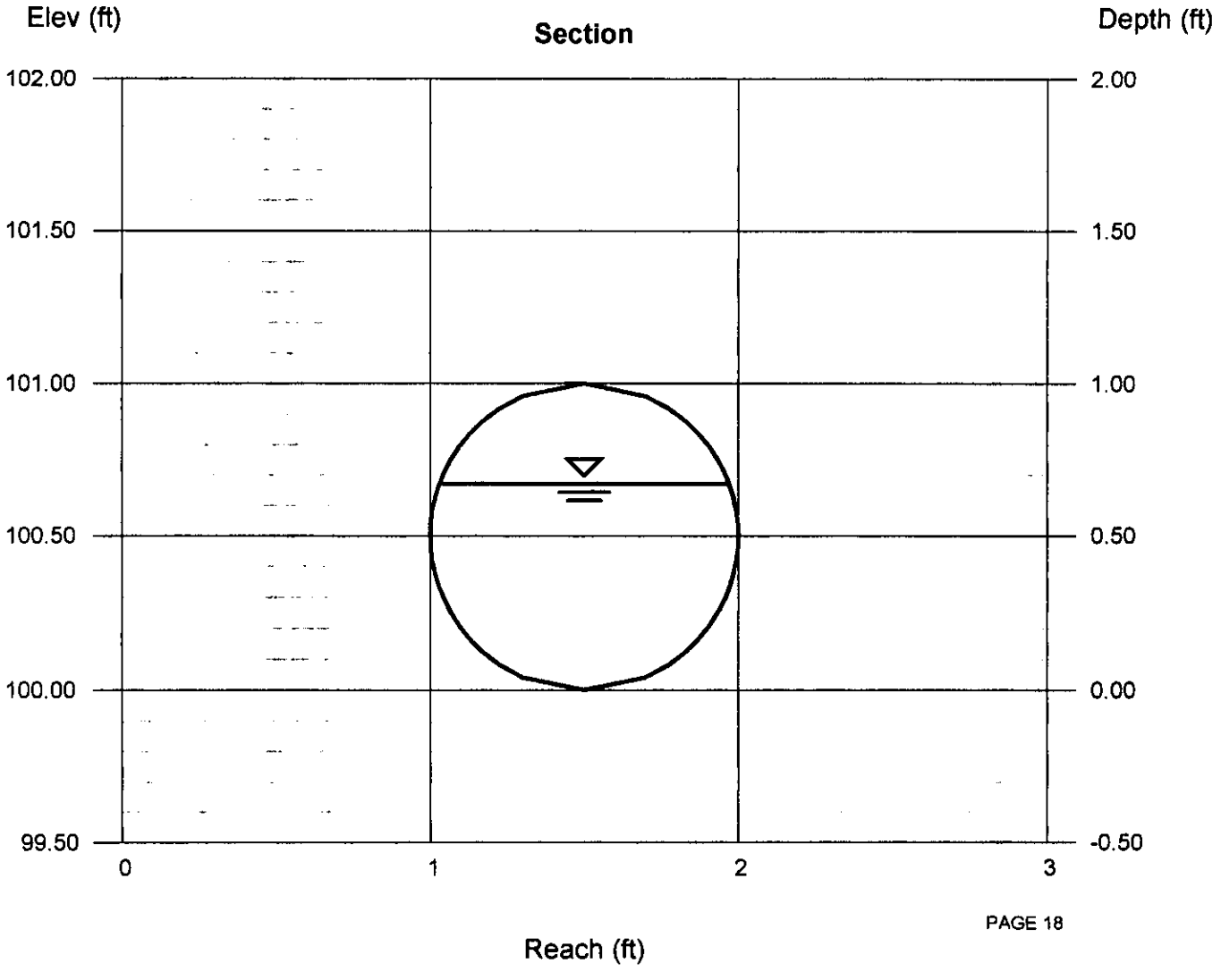
Diameter (ft)	= 1.00
Invert Elev (ft)	= 100.00
Slope (%)	= 1.00
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.04

Highlighted

Depth (ft)	= 0.67
Q (cfs)	= 3.040
Area (sqft)	= 0.56
Velocity (ft/s)	= 5.42
Wetted Perim (ft)	= 1.92
Crit Depth, Yc (ft)	= 0.75
Top Width (ft)	= 0.94
EGL (ft)	= 1.13



Channel Report

Swale #1(Trench Drain) - Area:C

Rectangular

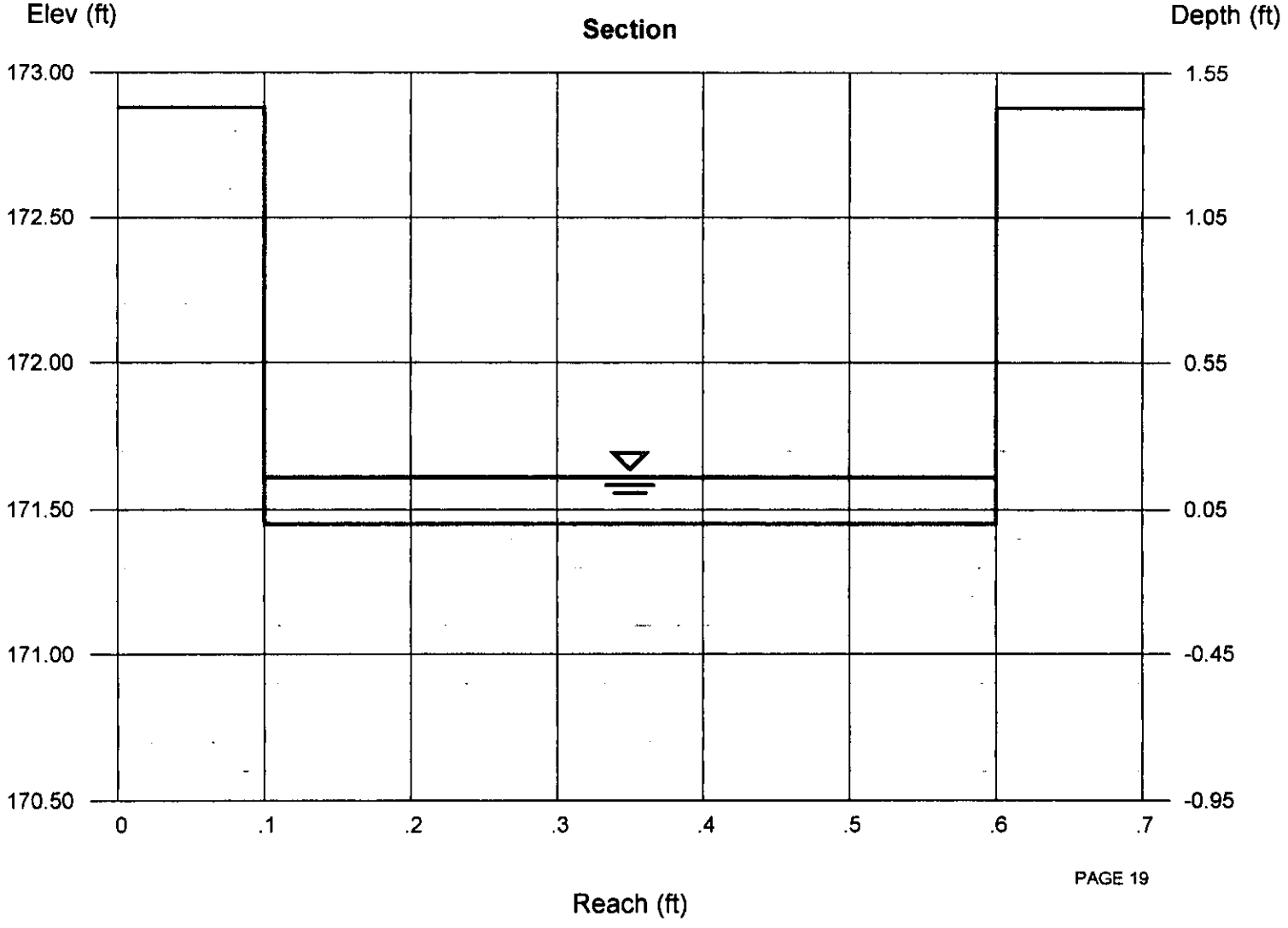
Bottom Width (ft)	= 0.50
Total Depth (ft)	= 1.43
Invert Elev (ft)	= 171.45
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.14

Highlighted

Depth (ft)	= 0.16
Q (cfs)	= 0.140
Area (sqft)	= 0.08
Velocity (ft/s)	= 1.75
Wetted Perim (ft)	= 0.82
Crit Depth, Yc (ft)	= 0.14
Top Width (ft)	= 0.50
EGL (ft)	= 0.21



Channel Report

SWALE 2 - AREA I

Triangular

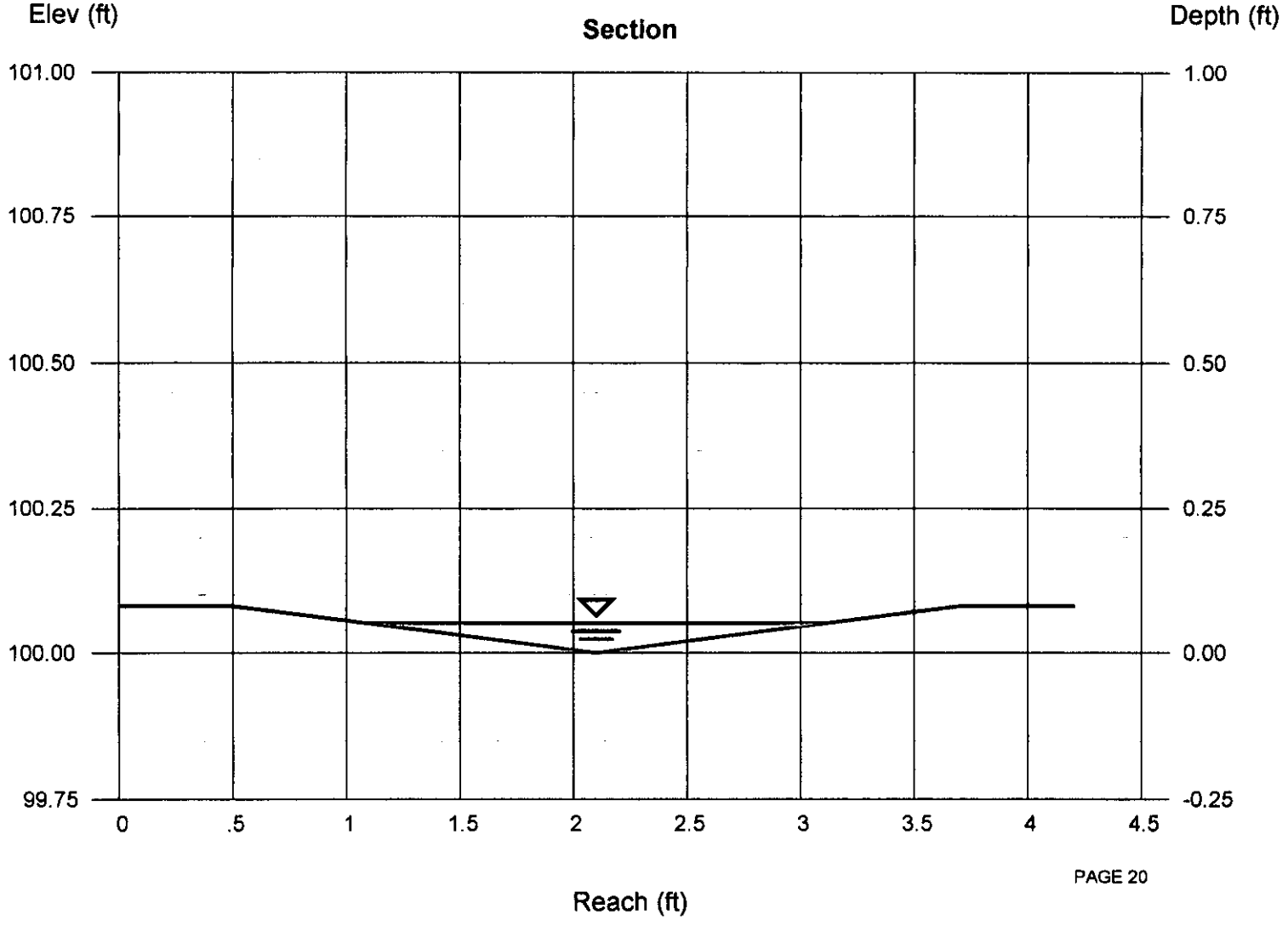
Side Slopes (z:1)	= 20.00, 20.00
Total Depth (ft)	= 0.08
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.03

Highlighted

Depth (ft)	= 0.05
Q (cfs)	= 0.030
Area (sqft)	= 0.05
Velocity (ft/s)	= 0.60
Wetted Perim (ft)	= 2.00
Crit Depth, Yc (ft)	= 0.05
Top Width (ft)	= 2.00
EGL (ft)	= 0.06



Channel Report

SWALE 3 - AREA G, I

Triangular

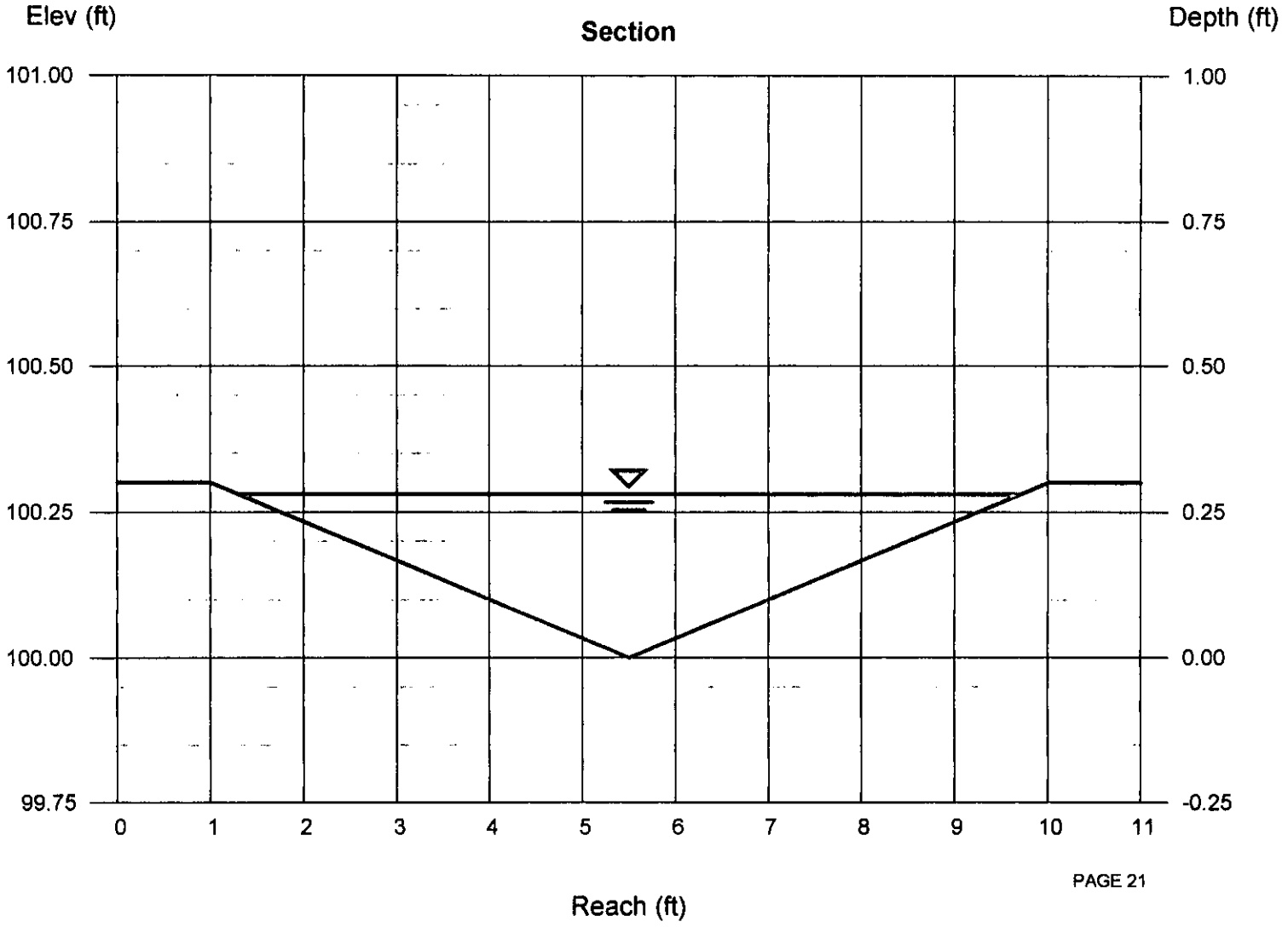
Side Slopes (z:1)	= 15.00, 15.00
Total Depth (ft)	= 0.30
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.94

Highlighted

Depth (ft)	= 0.28
Q (cfs)	= 0.940
Area (sqft)	= 1.18
Velocity (ft/s)	= 0.80
Wetted Perim (ft)	= 8.42
Crit Depth, Yc (ft)	= 0.19
Top Width (ft)	= 8.40
EGL (ft)	= 0.29



Channel Report

SWALE 4- AREA G,I

Triangular

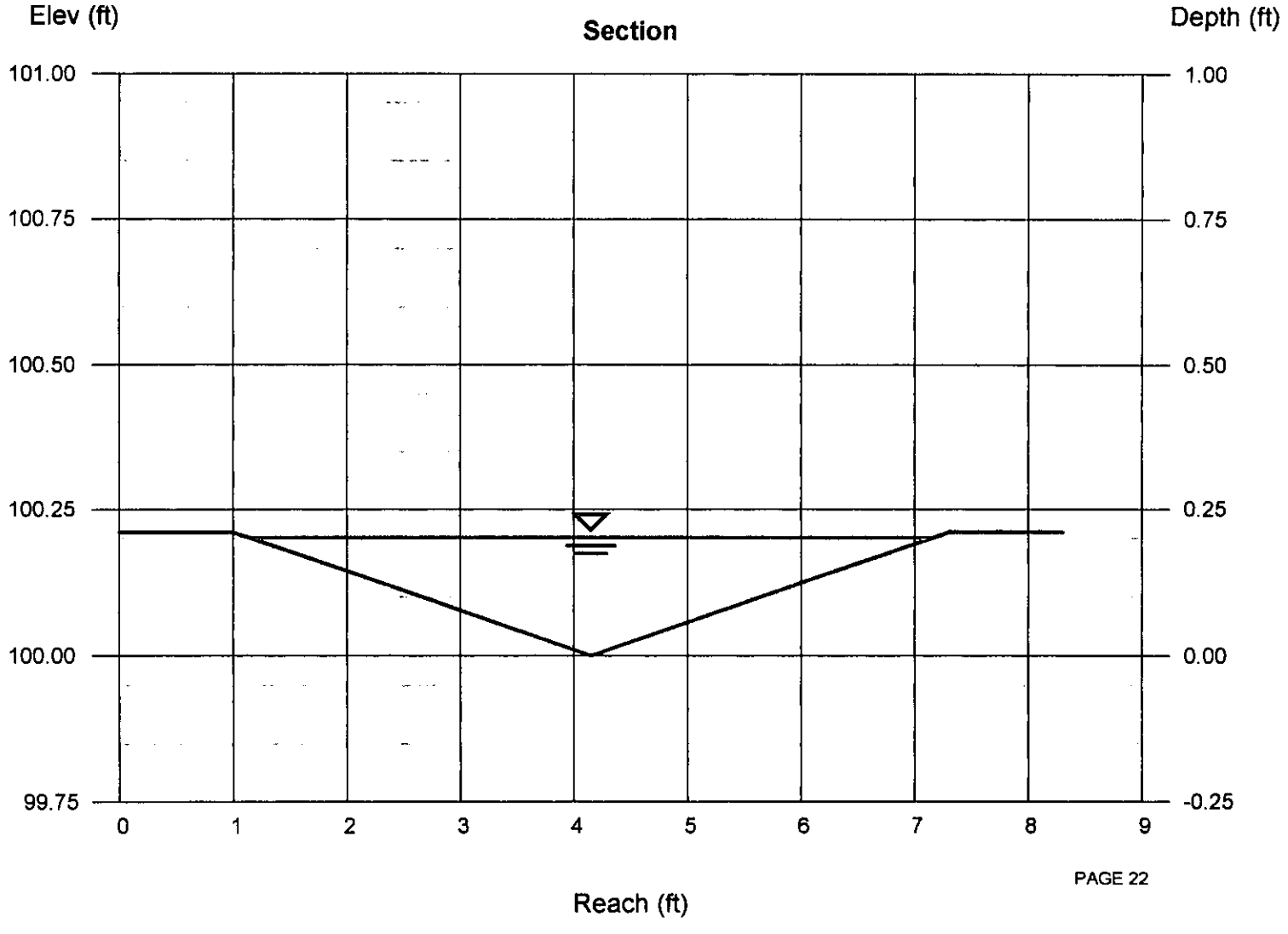
Side Slopes (z:1)	= 15.00, 15.00
Total Depth (ft)	= 0.21
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.94

Highlighted

Depth (ft)	= 0.20
Q (cfs)	= 0.940
Area (sqft)	= 0.60
Velocity (ft/s)	= 1.57
Wetted Perim (ft)	= 6.01
Crit Depth, Yc (ft)	= 0.19
Top Width (ft)	= 6.00
EGL (ft)	= 0.24



Required Grading Inspections

ENG-001

This is a list of required inspections to be performed by the grading inspector and, if engineered grading, by the engineer providing grading controls. If work requiring inspection is covered or concealed without first having been inspected, the grading inspector may require, by written notice, that such work be exposed for examination.

Project Address: 2110 HWY 116 N City: SEBASTOPOL

Grading Plan Check or Permit # GP014-0100 APN: 130-263-004

☒ The project plans have been checked and classified as **engineered grading**. (Chapter 11 Sonoma County Code)

☐ The project plans have been checked and classified as **non-engineered** grading. (Chapter 11 Sonoma County Code)

Note: Inspections, tests and reports are required when the corresponding box is checked.

Grading Inspector	Engineer
☒ Pre-construction meeting with contractor, grading inspector and/or others.	☒ Pre-construction meeting with contractor, geotechnical engineer, grading inspector and others, as applicable.
☒ Other inspections, as agreed at pre-construction meeting.	☒ Other inspections, as agreed at pre-construction meeting.
☒ Preparation of ground for fill placement, organic layer removed, competent material exposed, surface scarified, etc.	☒ Preparation of ground for fill placement, organic layer removed, competent material exposed, surface scarified, etc.
☐ Surface benched where surface receiving fill is steeper than 5h:1v.	☐ Surface benched where surface receiving fill is steeper than 5h:1v. (The geotechnical engineer may require benching at flatter than 5h:1v.)
☐ Key or core.	☐ Key or core.
☐ Terraces, as required.	☐ Subsurface drainage facilities.
☒ Surface drainage facilities including interceptor drains, swales, ditches on terraces, concrete or shotcrete ditch lining, etc.	☒ Fill placement method, suitability of materials, lift thickness, moisture content and density monitored and reported to contractor, etc. (Design specifications).
☒ Final rough grading of both cut and fill slopes, including terracing, rounding of top soil layer, setbacks from permit area boundaries, etc.	☐ Terraces, as required.
☒ Erosion control measures, either temporary or permanent, including sediment fences, installation of fabrics, seeding slopes, etc.	☒ Surface drainage facilities including interceptor drains, swales, ditches on terraces, concrete or shotcrete ditch lining, etc.
☒ Final inspection for code compliance. If engineered grading, the final report is also reviewed by grading inspector before the grading permit is finaled.	☒ Final rough grading of both cut and fill slopes, including terracing, rounding of top soil layer, setbacks from permit area boundaries, etc.
THESE ATTACHMENTS ARE PART OF THE APPROVED PLANS. * DO NOT REMOVE THEM * SEP 3 0 2014 PERMIT AND RESOURCE MANAGEMENT DEPARTMENT BUILDING PLAN CHECK PERMIT # GP014-0100	☒ Density tests and moisture content with moisture/density curve at locations chosen by engineer providing grading controls, not by contractor.
	☒ Erosion control measures, either temporary or permanent, including sediment fences, installation of fabrics, seeding slopes, etc.
	☒ "As Built" plans by civil engineer, if changes have been made during construction. Verification on line & grade by civil engineer may be requested by soils engineer or this department.
	☒ Final report by the soils engineer providing grading controls meeting the requirements.

Plan Checker: Ray Cuellar for Alex Reses Date: 30 Sep 14

*Engineer: [signature] Date: 8/14/14

*Engineer's signature is required for "**engineered**" grading.

PJC & Associates, Inc.
Consulting Engineers & Geologists

September 29, 2014 Job No. 2215.01

Marc Matulich
Matulich Architect
1518 Jewell Drive
Santa Rosa, CA 95404

BLD14-2383
GRD14-0100

Subject: Geotechnical Review of Civil Engineering Plans
Molino Corner Retail Center
2110 Gravenstein Highway North
Sebastopol, California
APN: 130-263-004

DRAINAGE REVIEW

References: Report titled, "Design Level Geotechnical Investigation, Proposed Husary Retail Center, 2110 Gravenstein Highway North, Sebastopol, California," prepared by PJC & Associates, Inc., dated November 7, 2005.

Report titled, "Geotechnical Investigation Report Review and Update, Proposed Molino Corner Retail Center, 2110 Gravenstein Highway North, Sebastopol, California," prepared by PJC & Associates, Inc., dated April 15, 2014.

Civil Engineering Plans, Sheets 1 through 7, prepared by Huffman Engineering, dated June 25, 2014.

Dear Marc:

PJC & Associates, Inc. (PJC) is pleased to submit this letter which presents the results of our geotechnical review of the civil engineering plans for the proposed Molino Corner Retail Center located at 2110 Gravenstein Highway North in Sebastopol, California. PJC previously prepared a geotechnical investigation for the project and presented the results in a written report, dated November 7, 2005. PJC also prepared updated geotechnical design criteria for the project and presented the results in a written report, dated April 15, 2014. The purpose of our plan review was to confirm that the recommendations in our reports were incorporated into the above referenced plans.

Based on the results of our geotechnical review, the above referenced plans are in conformance with the recommendations of the geotechnical report. However, we have the following comments:

1. A representative of PJC should observe all site preparation, grading and fill placement.

2. PJC should be retained to perform field density testing for the placement of engineered fill.

We trust that this is the information that you require at this time. If you have any questions concerning the content of this letter, please call.

Sincerely,

PJC & ASSOCIATES, INC.

Patrick J. Conway
Geotechnical Engineer
GE 2303, California

PJC/bc

cc: Rob Huffman (rob@huffmanengineering.net)

Mooseh@comcast.net

PJC & Associates, Inc.
Consulting Engineers & Geologists

April 15, 2014

Job No. 2215.01

Marc Matulich
Matulich Architect
1518 Jewell Drive
Santa Rosa, CA 95404
matulic@sonic.net

Subject: Geotechnical Investigation Report Review and Update
Proposed Molino Corner Retail Center
2110 Gravenstein Highway North
Sebastopol, California

References: Report titled, "Design Level Geotechnical Investigation, Proposed Husary Retail Center, 2110 Gravenstein Highway North, Sebastopol, California," prepared by PJC & Associates, Inc., dated November 7, 2005.

Dear Marc:

In accordance with your request, PJC and Associates, Inc. (PJC) is pleased to submit this letter presenting the results of our review of the original geotechnical investigation report and updated applicable sections of the report for the proposed commercial development located at 2110 Gravenstein Highway North in Sebastopol, California. PJC previously performed a geotechnical investigation for the project and presented the results in a written report, dated November 7, 2005.

The purpose of our review was to determine whether the original geotechnical investigation report is still applicable and valid for use in design and construction of the proposed project. Our scope of work consisted of updating the report to current building code standards and to include retaining wall design criteria. The recommendations and criteria presented in this update are intended to supersede the recommendations of the above referenced report. All other aspects of that report are to remain applicable for design and construction of the project.

Based on the results of our work, we judge that the project is feasible from a geotechnical engineering standpoint, provided the geotechnical recommendations and criteria presented in the previous report and herein are incorporated into design and construction of the project.

1. PROJECT DESCRIPTION

Based on information provided to us, the proposed project has not changed since the release of our original geotechnical investigation report referenced above. However, site retaining walls are planned for the project.

2. CONCLUSIONS

Based on the results of our current work, we judge that the previous geotechnical report is valid for use in design and construction of the project. However, updated retaining wall and seismic design criteria needed to be provided. These items are provided in the following sections of this report. All other findings and recommendations as presented in the previous report are valid.

The following presents additional criteria for design and construction of the project:

3. SEISMIC DESIGN

Based on criteria presented in the 2013 edition of the California Building Code (CBC) and ASCE (American Society of Civil Engineers) STANDARD ASCE/SEI 7-10, the following minimum criteria should be used in seismic design:

a.	Site Class:	C
b.	Mapped Acceleration Parameters:	S_S = 1.50 S_1 = 0.60
c.	Site Adjusted Spectral Response Acceleration Parameters:	S_{MS} = 1.50 S_{M1} = 0.78
d.	Design Spectral Acceleration Parameters:	S_{DS} = 1.00 S_{D1} = 0.52

4. RETAINING WALLS

a. Static Lateral Earth Pressures. Retaining walls free to rotate on the top should be designed to resist active lateral earth pressures. If walls are restrained by rigid elements to prevent rotation or supporting compacted engineered fill, they should be designed for "at rest" lateral earth pressures.

Retaining walls should be designed to resist the following earth equivalent fluid pressures (triangular distribution):

Active Pressure (level backfill) (5H:1V or less).....35 psf/ft
At Rest Pressure (level backfill) (5H:1V or less).....55 psf/ft

Active Pressure (2H:1V maximum slope backfill).....55 psf/ft
At Rest Pressure (2H:1V maximum slope backfill).....70 psf/ft

b. Drainage. We recommend that a backdrain be provided behind all retaining walls or that the walls be designed for full hydrostatic pressures. The backdrains should consist of four-inch diameter SDR 35, or equivalent, perforated pipe sloped to drain to outlets by gravity, and of clean, free-draining, three-quarter to one and one-half inch crushed rock or gravel. The crushed rock or gravel should extend 12 inches horizontally from the back face of the wall and extend from the bottom of the wall to two feet below the finished ground surface. The upper 24 inches should be backfilled with compacted fine-grained soil to exclude surface water. A Mirafi 140N filter cloth should be placed between the on-site native material and the drain rock to prevent clogging. If Class 2 permeable drain rock is used the filter fabric may be omitted.

5. ADDITIONAL SERVICES

Upon completion of the project plans, they should be reviewed by our firm to verify that the design is consistent with the recommendations of this report. During the course of this investigation, several assumptions were made regarding building loads and development concepts. Should our assumptions differ significantly from the final intent of the project designers, our office should be notified of the changes to assess any potential need for revised recommendations. Observation and testing services should be provided by PJC to verify that the intent of the plans and specifications is carried out during construction; these services should include observing foundation excavations, installation of the drainage facilities and observation and field density testing during grading and placement of engineered fill.

These services will be performed only if PJC is provided with sufficient notice to perform the work. PJC does not accept the responsibility for items that they are not notified to observe.

It has been a pleasure working with you on this project. Please call us if you have any questions regarding the results of this investigation, or if we can be of further assistance.

Sincerely,

PJC & ASSOCIATES, INC.

Patrick J. Conway
Geotechnical Engineer
GE 2303, California

PJC/rd

PJC & Associates, Inc.
Consulting Engineers & Geologists

November 7, 2005 Job No. 2215.01

George Husary
c/o Matulich Architect
Attention: Marc Matulich
62 Brookwood Avenue, Suite B
Santa Rosa, CA 95404

Subject: Design Level Geotechncial Investigation
Proposed Husary Retail Center
2110 Gravenstein Highway North
Sebastopol, California

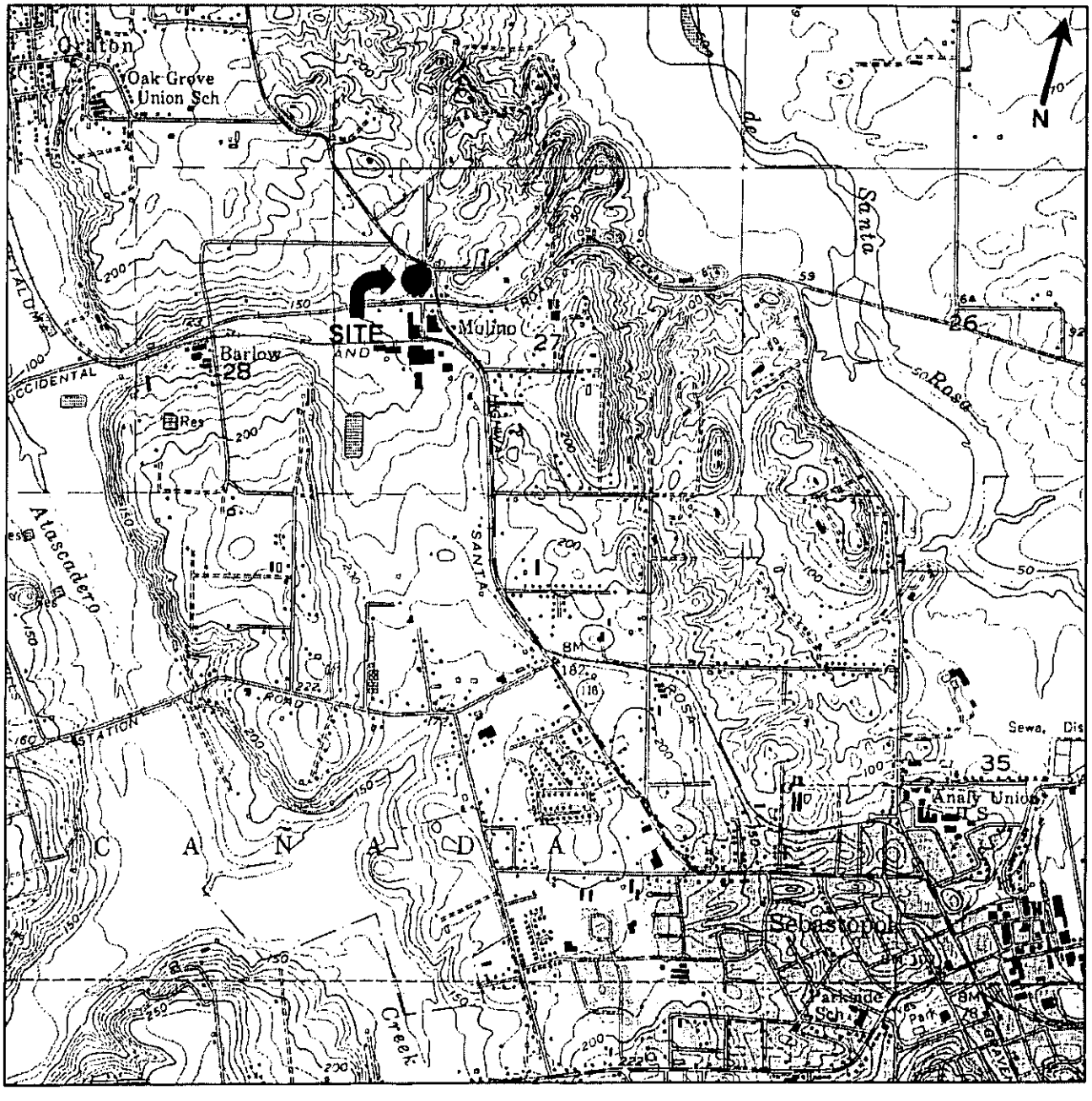
Dear Marc:

PJC and Associates, Inc. (PJC) is pleased to submit the results of our design level geotechnical investigation for the proposed Husary Retail Center located at 2110 Gravenstein Highway North in Sebastopol, California. The approximate location of the site is shown on the Site Location Map, Plate 1. Our services were completed in accordance with our proposal for geotechnical engineering services dated November 29, 2004. This report presents our engineering opinions and recommendations regarding the geotechnical aspects of the design and construction of the proposed project. Based on the results of this study, it is our opinion that the project site can be developed from a geotechnical engineering standpoint provided the recommendations presented herein are incorporated in the design and carried out through construction.

1. PROJECT DESCRIPTION

Based on the preliminary site plan prepared by Matulich Architect, it is our understanding that the proposed project will consist of demolishing an existing house and detached garage and constructing a new 6,900 square foot retail building. The building will consist of a single-story, wood-frame structure with a concrete slab-on-grade floor. The project will include asphalt paved parking areas and driveways and will be serviced by underground municipal utilities.

Structural loading information was not available at the time of this investigation. For our analysis, we anticipate that structural foundation loads will be light with dead plus live continuous wall loads less than two kips per lineal foot (plf) and dead plus live isolated column loads less than 50 kips. If these assumed loads vary significantly from the actual loads, we should be consulted to review the actual loading conditions and, if necessary, revise the recommendations of this report.



SCALE: 1:24,000

REFERENCE: USGS SEBASTOPOL CALIFORNIA QUADRANGLE, PHOTOREVISED 1980.

PJC & Associates
Consulting Engineers & Geologists

SITE LOCATION MAP
PROPOSED HUSARY RETAIL CENTER
2110 GRAVENSTEIN HIGHWAY NORTH
SEBASTOPOL, CALIFORNIA

PLATE
1

Proj. No: 2215.01 Date: 5/05 App'd by: PJC

At the time of this report, site grading and drainage plans or finished floor elevations were not available. Therefore, the amount of grading to be performed for the project is unknown at this time. Based on information provided by Matulich Architect, site grading will include lowering the site grade within the building envelope by approximately three feet. It is assumed that site grading of the remaining portions of the project will be minimal and consist of minor cuts and fills of three feet and less to achieve the desired parking area and driveway grades, and to provide adequate gradients for site drainage. We do not expect that significant cutting and filling will be required for the project. We do not expect that retaining walls will be used for the project.

2. SCOPE OF SERVICES

The purpose of this study is to provide geotechnical criteria for the design and construction of the proposed project. Specifically, the scope of our services included the following:

a. Drill four exploratory boreholes to depths between five and 10.5 feet below the existing ground surface to observe the soil, bedrock and groundwater conditions. Our field geologist was on site during the drilling to log the materials encountered in the boreholes and to obtain representative samples for visual classification and laboratory testing.

b. Laboratory observation and testing of representative samples obtained during the course of our field investigation to evaluate the engineering properties of the surface and subsurface soils and bedrock at the site.

c. Review seismological and geologic literature on the site area, discuss site geology and seismicity, and evaluate potential geologic hazards and earthquake effects (i.e., liquefaction, ground rupture, settlement, expansive soils, lurching and lateral spreading, etc.).

d. Perform engineering analyses to develop geotechnical recommendations for site preparation and earthwork, foundation type(s) and design criteria, lateral earth pressures, support of concrete slabs-on-grade, site drainage, flexible pavement design criteria and construction considerations.

e. Preparation of this report summarizing our work on this project.

3. SITE CONDITIONS

a. General. The site is located at 2110 Gravenstein Highway North in Sebastopol, California. The site is located in an agricultural area and is currently occupied by a gas station, food mart, single-family residence and a detached garage. Including the gas station, the triangular-shaped site comprises approximately one acre of land and is bounded by a vineyard to the north and west, Gravenstein Highway North to the east and Occidental

Road to the south.

b. Topography and Drainage. The site is located on level to moderately sloping topography, approximately one and one-half miles northwest of downtown Sebastopol. According to the United States Geological Survey (USGS) Sebastopol, California, 7.5 Minute Quadrangle Map (Topographic), the site is situated near an approximate elevation of 170 feet above mean sea level (MSL). The building will be constructed on a cut pad on top of a small, localized hill. The parking area and driveway will be constructed southeast of the building, on sloping ground, with an approximate maximum gradient of 15 percent. No creeks or seasonal drainage channels pass through the site. Site drainage generally consists of surface infiltration and sheet flow, which extends south and east to storm drains located on Gravenstein Highway North and Occidental Road. Regional drainage is provided by Atascadero Creek.

4. GEOLOGIC SETTING

The site is located in the Coast Ranges Geomorphic Province of California. This province is characterized by northwest trending topographic and geologic features, and includes many separate ranges, coalescing mountain masses and several major structural valleys. The province is bounded on the east by the Great Valley and on the west by the Pacific Ocean. It extends north into Oregon and south to the Transverse Ranges in Ventura County.

The structure of the northern Coast Ranges region is extremely complex due to continuous tectonic deformation imposed over a long period of time. The initial tectonic episode in the northern Coast Ranges was a result of plate convergence, which is believed to have begun during the late Jurassic period. This process involved eastward thrusting of oceanic crust beneath the continental crust (Klamath Mountains and Sierra Nevada) and the scraping off of materials that are now accreted to the continent (northern Coast Ranges). East-dipping thrust and reverse faults were believed to be the dominant structures formed.

Right lateral, strike slip deformation was superimposed on the earlier structures beginning mid-Cenozoic time, and has progressed northward to the vicinity of Cape Mendocino in Southern Humbolt County (Hart, Bryant and Smith, 1983). Thus, the principal structures south of Cape Mendocino are northwest trending, nearly vertical faults of the San Andreas system.

Based on geologic mapping of the site vicinity, the site is underlain by deposits of the Wilson Grove Formation (T_m). The Wilson Grove Formation consists predominantly of fine-grained sandstone and local minor coarse grained grit and tuff breccia. This classification was confirmed by our field investigation.

5. FAULTING

Geologic structures in the region are primarily controlled by northwest trending faults. No known active fault passes through the site. The site is not located in the Alquist-Priolo Earthquake Fault Studies Zone. Based on our research, the three closest known potentially active faults to the site are the Rodgers Creek, the Maacama (south) and the San Andreas faults. The Rodgers Creek fault is located seven miles to the northeast, the Maacama (south) fault is located approximately 13 miles to the northeast, and the San Andreas fault is located approximately 12 miles southwest of the site. Table 1 outlines the nearest known active faults and their associated maximum credible magnitudes.

TABLE 1
CLOSEST KNOWN ACTIVE FAULTS

Fault Name	Distance from Site (Miles)	Maximum Credible Earthquakes (Moment Magnitude)
Rodgers Creek	7	7.0
Maacama (south)	13	6.9
San Andreas	12	7.9

6. SEISMICITY

The site is located within a zone of high seismic activity related to the active faults that transverse through the surrounding region. Future damaging earthquakes could occur on any of these fault systems during the lifetime of the proposed project. In general, the intensity of ground shaking at the site will depend upon the distance to the causative earthquake epicenter, the magnitude of the shock, the response characteristics of the underlying earth materials, and the quality of construction. Seismic considerations and hazards are discussed in the following subsections of this report.

7. SUBSURFACE CONDITIONS

a. Soils. The subsurface conditions of the site were investigated by drilling four exploratory boreholes (BH-1 through BH-4) in the area of the proposed structure and driveway. The boreholes were drilled to depths between five and 10.5 feet below the existing ground surface. The approximate borehole locations are shown on the Borehole Location Plan, Plate 2. The boreholes were used to observe the subsurface conditions and to collect soil and bedrock samples of the underlying stratums for laboratory testing. The drilling and sampling procedures and descriptive borehole logs are included in Appendix A. The laboratory procedures are included in Appendix B.

The exploratory boreholes encountered artificial fill underlain by a continuous sandy clay residual soil deposit and sandstone bedrock of the Wilson Grove Formation. At the surface, the boreholes encountered one

to two feet of artificial fill, consisting of clayey sand and silty sand. The artificial fill appeared pale brown and gray brown in color, moist to wet, moderately compacted and fine to medium in grain size. A continuous sandy clay residual soil deposit underlies the artificial fill and extends to depths between five and one-half and eight feet below the existing ground surface. The sandy clay stratum appeared orange brown to mottled orange and pale yellow in color, moist to wet, stiff to hard and exhibited medium to high plasticity characteristics. The sandy clay deposit is underlain by sandstone bedrock, which extended to the maximum depths explored. The sandstone bedrock appeared mottled orange and pale yellow, slightly hard, friable and highly weathered.

b. Groundwater. No groundwater or seepage was encountered in the boreholes at the time of our investigation on January 14, 2005. No active springs or surface seeps were observed on the project site. However, like many sites on sloping terrain, perched groundwater zones can develop during and following prolonged rainfall. It has been our experience that perched groundwater zones, if they develop, will likely subside within several weeks following prolonged rainfall. Evaluation of groundwater levels below a depth of 10.5 feet is beyond the scope of this report.

8. GEOLOGIC CONCERNS AND SEISMIC CONSIDERATIONS

The site is located within a region subject to a high level of seismic activity. Therefore, the site could experience strong seismic ground shaking during the lifetime of the project. The following discussion reflects the geologic hazards and possible earthquake effects which could result in damage to the proposed structure.

a. Fault Rupture. Rupture of the ground surface is expected to occur along known active fault traces. No evidence of existing faults or previous ground displacement at the site due to fault movement is indicated in the geologic literature or field exploration. Therefore, the likelihood of ground rupture at the site due to faulting is considered to be low.

b. Ground Shaking. The site has been subjected in the past to ground shaking by earthquakes on the active fault systems that traverse the region. It is believed that earthquakes with significant ground shaking will occur in the region within the next several decades. Therefore, it must be assumed that the site will be subjected to strong ground shaking during the design life of the project.

c. Liquefaction. Our field exploration revealed no loose, saturated, granular soil stratums at the site. Therefore, it is judged that liquefaction is not likely to occur at the site within 10.5 feet of the ground surface. The evaluation of liquefaction potential below 10.5 feet is beyond the scope of this report.

d. Lateral Spreading and Lurching. Lateral spreading is normally induced by vibration of near horizontal alluvial soil layers adjacent to an exposed face. Lurching is an action, which produces cracks or fissures parallel to streams or banks when the earthquake motion is at right angles to them. There are no exposed faces near the proposed building envelope. Therefore we judge that the potential for lateral spreading and lurching at the site is low.

e. Expansive Soils. Based on Atterburg limits testing, the near surface residual soils have a high plasticity index (PI=28). Therefore, the near surface residual soils are potentially highly expansive.

9. CONCLUSIONS

Based on the results of our investigation, it is our professional opinion that the project is feasible from a geotechnical engineering standpoint provided the recommendations contained in this report are incorporated into the design and carried out through construction. The primary geotechnical concerns in design and construction of the project are the presence of weak and compressible artificial fill and the presence of potentially highly expansive near surface residual soils.

Weak and compressible suspected artificial fill was encountered at the surface of all the boreholes. These soils are of variable density and could be prone to differential settlement under new loads and are not suitable for the support of the foundations and slabs-on-grade. Additionally, the native, near surface residual soils are potentially expansive. Shrinking and/or swelling of these soils due to loss or increase in moisture content can cause irregular and differential ground movement and distress and damage to lightly loaded foundations, concrete slabs-on-grade and pavements.

You have indicated that site preparation will include making an approximate three foot cut in the area of the proposed building envelope. Where cuts of this size are performed, the artificial fill will be removed and the native residual soil exposed. The native soil which will be exposed is potentially expansive sandy clay.

Shallow spread footing foundations and conventional concrete slabs-on-grade constructed on the residual soils, which will be exposed by site grading, could be prone to distress and damage from swelling pressures caused by the clay. We consider heave and cracking of interior slabs-on-grade unacceptable.

To reduce the detrimental effects of the expansive soils to within tolerable limits, we recommend that the structure be supported on a blanket of non-expansive engineered fill. We judge that the thickness of the fill should be 24 inches. We anticipate that the existing fill on site would be suitable for use as compacted non-expansive engineered fill. With the use of non-expansive engineered fill, we

judge that the structure may be supported by a shallow spread footing foundation and a conventional concrete slab-on-grade may be used.

Asphaltic concrete pavements may be constructed on properly moisture conditioned and compacted weak and expansive surface soils if the owner understands and accepts the risk that periodic maintenance, including repair of edge cracking, may be required. Future maintenance of pavement areas could be reduced by placing import select fill under the driveway aggregate base.

The following sections provide recommendations and design criteria for the proposed project.

10. SITE GRADING AND EARTHWORK

Grading plans were not available at the time of this report. The portion of the site where the structure will be located is planned to consist of a level cut, approximately three feet below the existing grade. Driveways and parking areas will be constructed on moderately sloping terrain with an approximate maximum gradient of 15 percent. We anticipate that site grading will be minimal and consist of minor cuts and fills of three feet and less to achieve the desired building pad and driveway grades, and to provide adequate gradients for site drainage.

a. Stripping. Structural areas should be stripped of surface vegetation, artificial fills, debris, underground utilities, etc. Existing pavements not incorporated in the improvements should also be demolished. These materials should be moved off site; some of them, if suitable, could be stockpiled for later use in landscape areas. The existing artificial fill and weak surface soils within the building envelope should be removed in order to achieve the planned elevations. If underground utilities pass through the site, we recommend that these utilities be removed in their entirety or rerouted where they exist outside an imaginary plane sloped two horizontal to one vertical (2H:1V) from the outside bottom edge of the nearest foundation element. Voids left from the removal of utilities or other obstructions should be replaced with compacted engineered fill under the observation of the project geotechnical engineer.

b. Excavation and Compaction. Following site stripping, excavation should proceed to achieve finish grade or prepare areas to receive fill. All existing artificial fill should be completely removed in new structural areas and verified by the geotechnical engineer in the field during construction.

Upon completion of the cut for the building pad, the top 24 inches below slab subgrade should be subexcavated to provide for the placement of non-expansive engineered fill. The lateral extent of the subexcavation should extend at least five feet beyond the perimeter wall foundations. The subexcavation should be filled with a non-expansive material placed and compacted according to the recommendations given in the following

sections of this report. The existing on site fill may be suitable for this use.

The asphaltic concrete pavement sections may be placed directly on properly moisture conditioned and compacted weak and expansive surface soils provided the owner understands and accepts the risk that periodic maintenance, including repair of edge cracking, will likely be required. Where optimum pavement durability is desired, asphaltic pavements should be supported on 12 inches of compacted, non-expansive engineered fill. The lateral extent of the non-expansive fill should be a minimum of two feet beyond the edges of exterior concrete slabs-on-grade. The lateral extent of subgrade preparation should extend at least three feet beyond the edges of asphaltic concrete pavements.

The bottom of subexcavations scheduled to receive fill should be scarified to minimum depth of eight inches, moisture conditioned to a moisture content between two to four percent over optimum moisture content, and recompacted to a minimum of 90 percent of the materials relative maximum dry density as determined by ASTM D-1557 test procedures. All fill material should be placed and compacted in accordance with the recommendations presented in Table 2. It is recommended that import fill to be used on site be of a low to non-expansive nature and should meet the following criteria:

Plastic Index	less than 12
Liquid Limit	less than 35
Percent Soil Passing #200 Sieve	between 15% and 40%
Maximum Aggregate Size	4 inches

All fills should be placed in lifts no greater than eight inches in loose thickness and compacted to the recommendations provided in Table 2.

TABLE 2
SUMMARY OF COMPACTION RECOMMENDATIONS

Area	Compaction Recommendations*
General Engineered Fill (Import)	In lifts, a maximum of eight inches loose thickness, compact to a minimum of 90 percent relative compaction at or within two percent of the optimum moisture content.
General Engineered Fill (Native)	In lifts, a maximum of eight inches loose thickness, compact to at least 90 percent relative compaction at two to four percent over the optimum moisture content.
Trenches**	Compact to at least 90 percent relative compaction at or within two percent of the optimum moisture content.
Driveways and Parking Areas	Compact the top eight inches of subgrade to at least 95 percent relative compaction at two to four percent over the optimum moisture content.

*All compaction requirements stated in this report refer to dry density and moisture content relationships obtained through the laboratory standard described by ASTM D-1557-91
**Depths below finished subgrade elevations

Cut and fill slopes should be no steeper than two horizontal to one vertical (2H:1V). Steeper slopes should be retained.

A representative of PJC should observe all site preparation and fill placement. It is important that during the stripping, grading and scarification processes, a representative of our firm be present to observe whether any undesirable material is encountered in the construction area.

Generally, grading is most economically performed during the summer months when on site soils are usually dry of optimum moisture content. Delays should be anticipated in site grading performed during the rainy season or early spring due to excessive moisture in on-site soils. Special and relatively expensive construction procedures should be anticipated if grading must be completed during the winter and early spring.

11. FOUNDATIONS: SPREAD FOOTINGS

Conventional spread footings may be used for the structure provided they are founded in non-expansive compacted engineered fill.

a. Vertical Loads. The recommended soil bearing pressures, depths of embedment and minimum widths of spread footings are presented in Table 3. All footings should be reinforced. The bearing values provided have been calculated assuming that all footings extend a minimum of 12 inches into compacted non-expansive engineered fill.

TABLE 3
FOUNDATION DESIGN CRITERIA

Footing Type	Bearing Pressure (psf)*	Minimum Embedment (in)**	Minimum Width (in)
Continuous Wall	1,500	12	12
Isolated Column	2,000	12	18

* Dead plus live load.
** Below lowest adjacent grade.

The allowable soil bearing pressures are net values. The weight of the foundation and backfill over the foundation may be neglected when computing dead loads. Allowable soil bearing pressures may be increased by one-third for transient applications such as wind and seismic loads.

b. Lateral Loads. Resistance to lateral forces may be computed by using friction or passive pressure. A friction factor of 0.35 is considered appropriate between the bottom of the concrete structures and the

compacted engineered fill. A passive pressure equivalent to that exerted by a fluid weighing 350 pounds per square foot per foot of depth (psf/ft) is recommended. Unless restrained at the surface, the top six inches should be neglected for passive resistance.

Footing concrete should be placed neat against undisturbed soil. Footing excavations should not be allowed to dry before placing concrete. If shrinkage cracks appear in the footing excavations, the soil should be thoroughly moistened to close all cracks prior to concrete placement.

c. Settlement. Total settlement of individual foundations will vary depending on the width of the foundation and the actual load supported. Foundation settlements have been estimated based on the bearing values provided. Maximum settlements of shallow foundations designed and constructed in accordance with the preceding recommendations are estimated to be less than one inch. Differential settlement between similarly loaded, adjacent footings is expected to be less than one-half of one inch. The majority of the settlement is expected to occur during construction and placement of dead loads.

12. CONVENTIONAL SLABS-ON-GRADE

Conventional concrete slabs-on-grade should be supported on 24 inches of non-expansive compacted engineered fill. Exterior concrete slabs-on-grade located away from the structure may be supported on properly compacted and moisture conditioned surface soils if the risk of heave/settling and cracking is acceptable to the owner. If this risk is not acceptable, exterior slabs should be supported on at least 12 inches of non-expansive compacted engineered fill.

All slabs should be supported on at least four inches of clean gravel or crushed rock to provide a capillary break and provide uniform support for the slab. The rock should be graded so that 100 percent passes the one inch sieve and no more than five percent passes the No. 4 sieve. In areas subject to vehicular wheel loads, slabs should be underlain by eight inches of Class II aggregate base compacted to a minimum of 95 percent relative compaction.

We recommend that the gravel be placed as soon as possible after compaction of the subgrade to prevent drying of the subgrade soils. If the subgrade is allowed to dry out prior to slab-on-grade construction, the subgrade soil should be moisture conditioned by sprinkling before slab-on-grade construction. The slab subgrades should be moisture conditioned to at least two to four percent over optimum and rolled to produce a firm and unyielding subgrade.

We recommend that slabs be designed and reinforced as determined by the project structural engineer. Special care should be taken to insure that reinforcement is placed at the slab mid-height.

For slabs-on-grade with moisture sensitive surfacing, we recommend that an impermeable membrane be placed over the rock to prevent migration of moisture vapor through the concrete slab. In order to promote a more uniform curing of the slab and to provide protection of the vapor membrane, it is advisable to place two inches of fine sand on top of the membrane prior to placing the slab concrete. The sand should be moistened slightly prior to placing concrete. However, in areas subjected to vehicular loading the two inch layer of sand should be omitted.

13. SEISMIC DESIGN

Based on the data reviewed, it is concluded that the project site could be subjected to seismic shaking from earthquakes on the active faults primarily in the Coast Ranges. Based on criteria of the 2001 edition of the California Building Code (CBC), the following should be used in seismic design:

a.	Distance and Source:	12 KM (Rodgers Creek)
b.	FaultType:	A
c.	Soil Profile Factor:	Sc
d.	Near Source Factors:	Na = 1.0 Nv = 1.12

14. UTILITY TRENCHES

Shallow excavations for utility trenches can be readily made with either a backhoe or trencher; larger earth moving equipment should be used for deeper excavations. We expect the walls of trenches less than five feet deep, excavated into engineered fill or native soils, to remain in a near-vertical configuration during construction provided no equipment or excavated spoil surcharges are located near the top of the excavation. Where trenches extend deeper than five feet, the excavation may become unstable. All trenches, regardless of depth, should be evaluated to monitor stability prior to personnel entering the trenches. Shoring or sloping of any deep trench wall may be necessary to protect personnel and to provide stability. All trenches should conform to the current CAL-OSHA requirements for worker safety.

The trenches may be backfilled with native soils and should be compacted to at least 90 percent of maximum dry density in structural areas and 85 percent in non-structural areas. The moisture content of the compacted backfill soils should be at two percent over optimum moisture. Jetting should not be used.

Special care should be taken in the control of utility trench backfilling in pavement and slab-on-grade areas. Poor compaction will cause excessive settlements resulting in damage to the pavements and slabs. In pavement areas,

the top eight inches of trench backfill should be compacted to at least 95 percent relative compaction.

15. ASPHALTIC CONCRETE PAVEMENTS

Based on our investigation, the existing surface soils will have a low supporting capacity (after properly compacted) when used as a pavement subgrade. Based on laboratory testing, an R-value of 9 was used in asphaltic concrete pavement design calculations.

Pavement thicknesses were computed from Chapter 600 of the Caltrans Highway Design Manual and are based on a pavement life of 20 years. The Traffic Indexes (TI) used are judged representative of the anticipated traffic but are not based on actual vehicle counts. The actual traffic indexes should be determined and provided by the project civil engineer. The recommended pavement sections are presented in table 4.

Prior to placement of the aggregate base material, the top eight inches of the pavement subgrade should be scarified, moisture conditioned to two to four percent over the optimum moisture content, and compacted to a minimum of 95 percent relative compaction. Aggregate base material should be spread in thin layers and compacted to at least 95 percent relative compaction to form a firm and unyielding base.

The material and methods used should conform to the requirements of the City of Sebastopol specifications or the current edition of the Caltrans Standard Specifications, except that compaction requirements for the soil subgrade and aggregate baserock should be based on ASTM D-1557-91. Aggregate used for the base coarse should comply with the minimum requirements specified in Caltrans Standard Specifications, Section 26, for Class 2 aggregate base.

In general, the pavements should be constructed during the dry season to avoid the saturation of the subgrade and base materials, which often occurs during the wet winter months. If pavements are constructed during the winter and early spring, a cost increase relative to drier weather construction should be anticipated. The soils engineer should be consulted for recommendations at the time of construction.

Where pavements will abut landscaped areas, water can seep below the concrete curb and into the base rock within the pavement section. Continued saturation of the base rock leads to permanent wetness towards the lower elevation of the pavement where water ponds. Soft subgrade conditions and pavement damage can occur as a result.

Several precautionary measures can be taken to minimize the intrusion of water into the base rock; however, the cost to install the protective measures should be balanced against the cost of repairing damaged pavement sections. An

alternative, which can be taken to extend the life of the pavement, would be to construct a cutoff wall along the perimeter edge of the pavement. The wall should consist of a lean concrete mix. The trench should be four inches wide and extend at least 36 below the lowest adjacent grade.

Where trees are located adjacent to pavement areas, we recommend that a suitable impervious root barrier be included to minimize water mitigation into the pavement layer.

TABLE 4
PAVEMENT DESIGN FOR PAVEMENT AREAS
(Subgrade R-Value = 9)

Traffic Index	Asphaltic Concrete (in)	Class II Aggregate Base (in)
4.0	2.0	8.0
5.0	2.5	10.0
6.0	3.0	12.5
7.0	3.5	15.5

16. DRAINAGE

All final grades should be provided with positive gradients away from all foundations to provide rapid removal of surface water runoff to an adequate discharge point. No ponding of water should be allowed adjacent to or on asphaltic concrete pavements or adjacent to the building foundations.

The use of continuous roof gutters is recommended to reduce the possibility of soil saturation adjacent to the building. Downspouts from gutters should be discharged into a closed conduit discharging a minimum of eight feet away from the structures.

17. LIMITATIONS

The data, information, interpretations and recommendations contained in this report are presented solely as bases and guides to the geotechnical design of the proposed Husary Retail Center located at 2110 Gravenstein Highway North in Sebastopol, California. The conclusions and professional opinions presented herein were developed by PJC in accordance with generally accepted geotechnical engineering principles and practices. No warranty, either expressed or implied, is intended.

This report has not been prepared for use by parties other than the designers of the project. It may not contain sufficient information for the purposes of other parties or other uses. If any changes are made in the project as described in this report, the conclusions and recommendations contained herein should not be considered valid, unless the changes are reviewed by PJC and the conclusions and recommendations are modified or approved in writing. This report and the

figures contained herein are intended for design purposes only. They are not intended to act by themselves as construction drawings or specifications.

Soil and bedrock deposits may vary in type, strength, and many other important properties between points of observation and exploration. Additionally, changes can occur in groundwater and soil moisture conditions due to seasonal variations or for other reasons. Therefore, it must be recognized that we do not and cannot have complete knowledge of the subsurface conditions underlying the subject site. The criteria presented are based on the findings at the points of exploration and on interpretative data, including interpolation and extrapolation of information obtained at points of observation.

18. ADDITIONAL SERVICES

Upon completion of the project plans, they should be reviewed by our firm to verify that the design is consistent with the recommendations of this report. Observation and testing services should also be provided by PJC to verify that the intent of the plans and specifications are carried out during construction; these services should include observing the foundation excavations and density testing of all fill and pavement sections.

These services will be performed only if PJC is provided with sufficient notice to perform the work. PJC does not accept responsibility for items we are not notified to observe.

It has been a pleasure working with you on this project. Please call if you have any questions regarding this report or if we can be of further assistance.

Sincerely,

PJC & ASSOCIATES, INC.

Jonathan Morris
Project Engineer

Patrick J. Conway
Geotechnical Engineer
GE 2303, California

JM:jm

APPENDIX A
FIELD INVESTIGATION

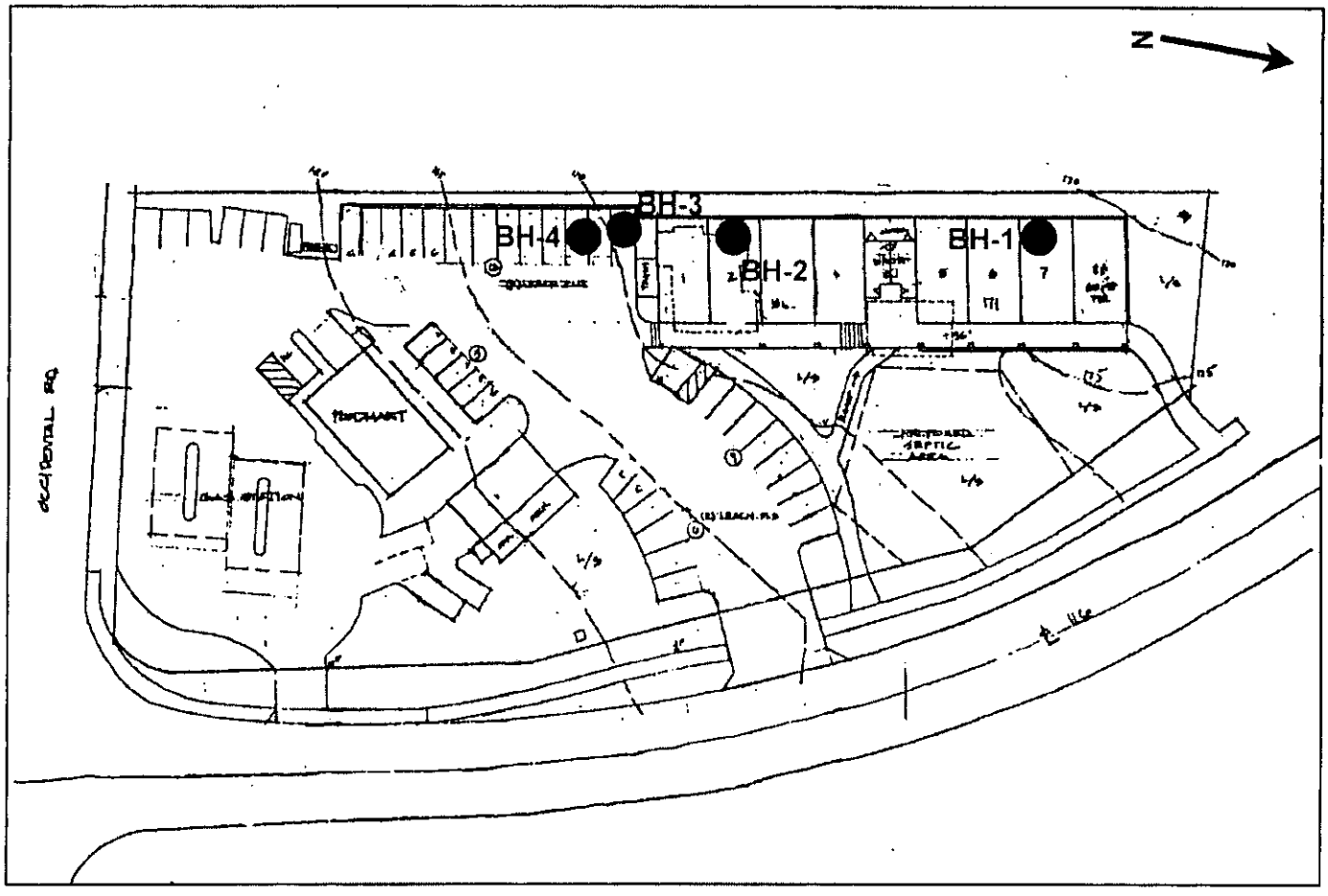
1. INTRODUCTION

The field program performed for this study consisted of drilling four exploratory boreholes (BH-1 through BH-4) in the vicinity of the proposed structure and driveway. The exploration was completed on January 14, 2005. The borehole locations are shown on the Borehole Location Plan, Plate 2. Descriptive logs of the boreholes are presented in this appendix as Plates 3 through 6.

2. BOREHOLES

The boreholes were advanced using a portable powered drill rig with solid stem flight augers. The drilling was performed under the observation of a geologist of PJC who maintained a continuous log of the soil and bedrock conditions and obtained soil samples suitable for laboratory testing. The soils were classified in accordance with the Unified Soil Classification System, as explained in Plate 7. The bedrock was classified according to plate 8.

Relatively undisturbed and disturbed samples were obtained from the exploratory boreholes. A 2.43 inch I.D. California Modified Sampler was driven into the underlying soil using a 70 pound hammer falling 30 inches to obtain an indication of the field density of the soil and to allow visual examination of at least a portion of the soil column. Soil samples obtained with the split-spoon sampler were retained for further observation and testing. The number of blows required to drive the sampler at six inch increments was recorded on each borehole log. All samples collected were labeled and transported to PJC's office for examination and laboratory testing.



EXPLANATION

● BORE HOLE LOCATION AND DESIGNATION

NO SCALE

REFERENCE: SITE PLAN PREPARED BY MATULICH ARCHITECT, UNDATED.

PJC & Associates *Consulting Engineers & Geologists*	BORE HOLE LOCATION PLAN PROPOSED HUSARY RETAIL CENTER 2110 GRAVENSTEIN HIGHWAY NORTH SEBASTOPOL, CALIFORNIA	PLATE **2**
	Proj. No: 2215.01 Date: 5/05 App'd by: PJC	

LOG OF BOREHOLE NO. BH-1

PROPOSED HUSARY RETAIL CENTER
2110 GRAVENSTEIN HIGHWAY NORTH
SEBASTOPOL, CALIFORNIA

TYPE: PORTABLE POWERED LOCATION: NORTHWEST CORNER

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FOOT OR RECOVERY, %	STRATUM DESCRIPTION	LAYER ELEV./ DEPTH	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX (PI), %	PASSING NO. 200 SIEVE, %	UNIT DRY WEIGHT, PCF	COMPRESSIVE STRENGTH TSF
				SURF. EL N/A								
			13	0.0-2.0': CLAYEY SAND (SC): grayish brown, wet, moderately compacted, fine grained (FILL)								
			17	2.0-8.0': SANDY CLAY (CH): orange brown, wet, stiff, high plasticity (RESIDUAL SOIL)	2.0	31					85	1.25(P)
						36					86	1.0(P)
5			21									
						36					84	
			43	8.0-10.5': SANDSTONE: mottled orange and pale yellow, slightly hard, friable, highly weathered (BEDROCK)	8.0							
10						30					87	
						30					91	
				TERMINATED AT 10.5 FEET	10.5							

COMPLETION DEPTH: 10.5' DEPTH TO WATER: NOT ENCOUNTERED

DATE: 1-14-05

U = Unconfined P = Pocket Penetrometer
Q = Unconsolidated-Undrained Triaxial T = Torvane

GEOT 2/15 11-7-05

PLATE 3

LOG OF BOREHOLE NO. BH-2

PROPOSED HUSARY RETAIL CENTER
2110 GRAVENSTEIN HIGHWAY NORTH
SEBASTOPOL, CALIFORNIA

TYPE: **PORTABLE POWERED** LOCATION: **WEST SIDE**

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FOOT OR RECOVERY, %	STRATUM DESCRIPTION	LAYER ELEV./ DEPTH	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX (PI), %	PASSING NO. 200 SIEVE, %	UNIT DRY WEIGHT, PCF	COMPRESSIVE STRENGTH TSF
				SURF. EL N/A								
				0.0-1.0': CLAYEY SAND (SC): pale brown, moist, moderately compacted, fine to medium grained (FILL)	1.0							
			42	1.0-7.0': SANDY CLAY (CH): orange brown, moist to very moist, hard to medium stiff, high plasticity (RESIDUAL SOIL)		27	53	25	28		93	4.5+(P)
5			30			35					85	0.9(U)
			47	7.0-9.5': SANDSTONE: mottled orange and pale yellow, slightly hard, friable, highly weathered (BEDROCK)	7.0	28					90	
				TERMINATED AT 9.5 FEET	9.5							

COMPLETION DEPTH: **9.5'** DEPTH TO WATER: **NOT ENCOUNTERED**

DATE: **1-14-05**

U = Unconfined P = Pocket Penetrometer
Q = Unconsolidated-Undrained Triaxial T = Torvane

GEOT 2/05 11.7.05

PLATE 4

LOG OF BOREHOLE NO. BH-3

PROPOSED HUSARY RETAIL CENTER
2110 GRAVENSTEIN HIGHWAY NORTH
SEBASTOPOL, CALIFORNIA

TYPE: **PORTABLE POWERED** LOCATION: **SOUTHWEST SIDE**

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FOOT OR RECOVERY, %	STRATUM DESCRIPTION	LAYER ELEV./ DEPTH	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX (PI), %	PASSING NO. 200 SIEVE, %	UNIT DRY WEIGHT, PCF	COMPRESSIVE STRENGTH TSF
				SURF. EL N/A								
			25	0.0-2.0': SILTY SAND (SM): pale brown, very moist, moderately compacted, fine to medium grained (FILL)								
			20	2.0-5.5': SANDY CLAY (CH): mottled orange and pale yellow, moist to very moist, stiff, high plasticity (RESIDUAL SOIL)	2.0	24					94	1.5(P)
5						34					84	1.0(P)
			38	5.5-8.5': SANDSTONE: mottled orange and pale yellow, slightly hard, friable, highly weathered (BEDROCK	5.5	32					85	
				TERMINATED AT 8.5 FEET	8.5							

COMPLETION DEPTH: **8.5'** DEPTH TO WATER: **NOT ENCOUNTERED**

DATE: **1-14-05**

U = Unconfined P = Pocket Penetrometer
Q = Unconsolidated-Undrained Triaxial T = Torvane

GEOT 2265 11-7-05

PLATE 5

LOG OF BOREHOLE NO. BH-4

PROPOSED HUSARY RETAIL CENTER
2110 GRAVENSTEIN HIGHWAY NORTH
SEBASTOPOL, CALIFORNIA

TYPE: **PORTABLE POWERED** LOCATION: **SOUTHWEST SIDE**

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FOOT OR RECOVERY, %	STRATUM DESCRIPTION	LAYER ELEV./ DEPTH	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX (PI), %	PASSING NO. 200 SIEVE, %	UNIT DRY WEIGHT, PCF	COMPRESSIVE STRENGTH TSF
				SURF. EL N/A								
				0.0-2.0'; SILTY SAND (SM); pale brown, moist, moderately compacted, fine grained (FILL)								
				2.0-5.0'; SANDY CLAY (CH); mottled orange and pale yellow, very moist, very stiff, high plasticity (RESIDUAL SOIL)	2.0							
5					5.0							
				TERMINATED AT 5.0 FEET								

COMPLETION DEPTH: **5.0'** DEPTH TO WATER: **NOT ENCOUNTERED**

DATE: **1-14-05**

U = Unconfined P = Pocket Penetrometer
Q = Unconsolidated-Undrained Triaxial T = Torvane

GEOF 2215 11-705

PLATE 6

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS (MORE THAN HALF IS LARGER THAN NO. 200 SIEVE)	GRAVELS (MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL - SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL - SAND - SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL - SAND - CLAY MIXTURES
	SANDS (MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND - SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN HALF IS SMALLER THAN NO. 200 SIEVE)	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

UNIFIED SOIL CLASSIFICATION SYSTEM

Shear Strength, psf

Confining Pressure, psf

Consol - Consolidation	Tx	320	(2600)	Unconsolidated Undrained Triaxial
LL - Liquid Limit (in %)	Tx CU	320	(2600)	Consolidated Undrained Triaxial
PL - Plastic Limit (in %)	DS	2750	(2000)	Consolidated Drained Direct Shear
PI - Plasticity Index	FVS	470		Field Vane Shear
G_s - Specific Gravity	UC	2000		Unconfined Compression
SA - Sieve Analysis	LVS	700		Laboratory Vane Shear
"Undisturbed" Sample	SS - Shrink Swell			
Bulk or Disturbed Sample	EXP - Expansion			
Standard Penetration Test	P - Permeability			
Sample Attempt with No Recovery				

Note: All strength tests on 2.8" or 2.4" diameter sample unless otherwise indicated.

KEY TO TEST DATA

PJC & Associates
Consulting Engineers & Geologists

PROPOSED HUSARY RETAIL CENTER
2110 GRAVENSTEIN HIGHWAY NORTH
SEBASTOPOL, CALIFORNIA

PLATE 7

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ROCK TYPES

 CONGLOMERATE

 SHALE

 METAMORPHIC ROCKS
HYDROTHERMALLY-ALTERED ROCKS

 SANDSTONE

 SHEARED SHALE MELANGE

 IGNEOUS ROCKS

 META-SANDSTONE

 CHERT

BEDDING THICKNESS

MASSIVE	Greater than 6 feet
THICKLY BEDDED	2 to 6 feet
MEDIUM BEDDED	8 to 24 inches
THINLY BEDDED	2-1/2 to 8 inches
VERY THINLY BEDDED	3/4 to 2-1/2 inches
CLOSELY LAMINATED	1/4 to 3/4 inches
VERY CLOSELY LAMINATED	Less than 1/4 inch

JOINT, FRACTURE, OR SHEAR SPACING

VERY WIDELY SPACED	Greater than 6 feet
WIDELY SPACED	2 to 6 feet
MODERATELY WIDELY SPACED	8 to 24 inches
CLOSELY SPACED	2-1/2 to 8 inches
VERY CLOSELY SPACED	3/4 to 2-1/2 inches
EXTREMELY CLOSELY SPACED	Less than 3/4 inch

HARDNESS

Soft - pliable; can be dug by hand

Slightly Hard - can be gouged deeply or carved with a pocket knife

Moderately Hard - can be readily scratched by a knife blade; scratch leaves heavy trace of dust and is readily visible after the powder has been blown away

Hard - can be scratched with difficulty; scratch produces little powder and is often faintly visible

Very Hard - cannot be scratched with pocket knife, leaves a metallic streak

STRENGTH

Plastic - capable of being molded by hand

Friable - crumbles by rubbing with fingers

Weak - an unfractured specimen of such material will crumble under light hammer blows

Moderately Strong - specimen will withstand a few heavy hammer blows before breaking

Strong - specimen will withstand a few heavy ringing hammer blows and usually yields large fragments

Very Strong - rock will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.

DEGREE OF WEATHERING

Highly Weathered - abundant fractures coated with oxides, carbonates, sulphates, mud, etc., through discoloration, rock disintegration, mineral decomposition

Moderately Weathered - some fracture coating, moderate or localized discoloration, little to no effect on cementation, slight mineral decomposition

Slightly Weathered - a few stained fractures, slight discoloration, little or no effect on cementation, no mineral decomposition

Fresh - unaffected by weathering agents, no appreciable change with depth.

APPENDIX B
LABORATORY INVESTIGATION

1. INTRODUCTION

This appendix includes a discussion of test procedures and results of the laboratory investigation performed for the proposed project. The investigation program was carried out by employing, whenever practical, currently accepted test procedures of the American Society of Testing and Materials (ASTM).

Undisturbed samples used in the laboratory investigation were obtained during the course of the field investigation as described in Appendix A of this report. Identification of each sample is by hole number and depth. The laboratory tests performed during the course of the investigation are described below.

2. INDEX PROPERTY TESTING

In the field of soil mechanics and geotechnical engineering design, it is advantageous to have a standard method of identifying soils and classifying them into categories or groups that have similar distinct engineering properties. The most commonly used method of identifying and classifying soils according to their engineering properties is the Unified Soil Classification System described by ASTM D-2487-83. The USCS is based on recognition of the various types and significant distribution of soil characteristics and plasticity of materials.

The index properties tests discussed in this report include the determination of Atterburg Limits and natural water content and dry density.

a. Atterburg Limits Determination. Liquid and plastic limits were determined on selected samples in accordance with ASTM D-4318-83. The results of the tests are shown on the borehole logs.

b. Natural Water Content and Dry Density. Natural water content and dry density of the soils were determined on selected undisturbed samples. The samples were extruded, visually classified, trimmed to obtain a smooth flat face and accurately measured to obtain volume and wet weight. The samples were then dried, in accordance with ASTM D-2216-80, for a period of 24 hours in an oven maintained at a temperature of 100° C. After drying, the weight of each sample was determined and the moisture content and dry density calculated. The water content and dry density results are summarized on the log of the boreholes, Plates 3 through 6.

3. ENGINEERING PROPERTIES TESTING

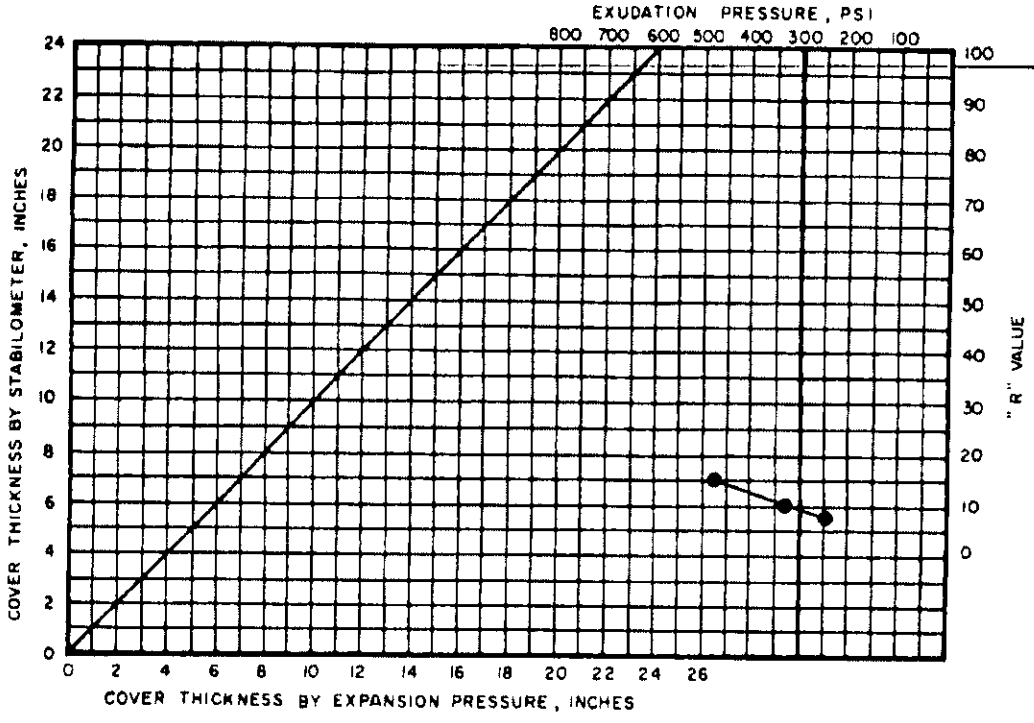
The engineering property tests consisted of unconfined compression and R-Value testing.

a. Unconfined Compression Test. Unconfined compression tests were performed on intact samples obtained from the boreholes. In the unconfined compression test, the shear strength is determined by axially loading the sample under a slow constant strain rate until failure is obtained. Failure stress is defined as the maximum stress at ten percent strain. The results of the tests are presented on the borehole logs.

b. R-value. An R-value test was performed on a representative sample of the near-surface soil to develop criteria for design of pavement sections. The test was conducted in accordance with the California Division of Highways Test Method No. 310; the test results are shown on Plate 9.

RESISTANCE VALUE TEST RESULTS

Sample No. 1



Sample Description: MOTTLED ORANGE AND PALE YELLOW SANDY CLAY (CH); BH-4 AT 2.0-5.0 FEET

Specimen	A	B	C
Exudation Pressure, psi	245	326	473
Expansion Dial (.0001")	------	------	------
Expansion Pressure, psf	0	9	35
Resistance Value, "R"	7	10	15
% Moisture at Test	25.3	24.4	22.9
Dry Density at Test, pcf	96.3	98.9	103.1
"R" Value at 300 psi, Exudation Pressure	9		
"R" Value by Expansion Pressure-T.I.= Gf=	----------		

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R-VALUE TEST
PROPOSED HUSARY RETAIL CENTER
2110 GRAVENSTEIN HIGHWAY NORTH
SEBASTOPOL, CALIFORNIA

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PLATE
9

APPENDIX C
REFERENCES

1. "Foundations and Earth Structures" Department of the Navy Design Manual 7.2 (NAVFAC DM-7.2), dated May 1982.

2. "Soil Dynamics, Deep Stabilization, and Special Geotechnical Construction" Department of the Navy Design Manual 7.3 (NAVFAC DM-7.3), dated April 1983.

3. Geologic Map of the Santa Rosa Quadrangle, Scale: 1:250,000, compiled by D.L. Wagner and E.J. Bortugno, 1982.

4. Geology for Planning in Sonoma County, Special Report 120, California Division of Mines and Geology, 1980.

5. "Soil Mechanics" Department of the Navy Design Manual 7.1 (NAVFAC DM-7.1), dated May 1982.

6. USGS Sebastopol California Quadrangle 7.5-Minute Topographic Map, photo-revised 1980.

7. McCarthy, David. Essential of Soil Mechanics and Foundations. 5th Edition, 1998.

8. Bowels, Joseph, Engineering Properties of Soils and Their Measurement. 4th Edition, 1992.

9. California Building Code (CBC), 2001 edition.

10. "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada," California Department of Conservation Division of Mines and Geology, dated February 1998.

11. Tentative Site Plan, prepared by Matulich Architect, not dated.